COAL AGE

Vol. 7 NEW YORK, JUNE 12, 1915 No. 24

Selecting A Mining Machine

A Manager of a Large Coal Mining Company put the Following Question to Us:

QUESTION:

"I have decided to equip one of our mines with mining machines throughout; we have never had any experience with such machines, and I want to know how to decide upon the make or type of coal cutter that I ought to adopt. I am a great believer in standardizing equipment and I want to make sure that I get the right machine so that I won't have to keep shifting around, and incidentally I desire to avoid filling our supply house with repair parts that will never be used."

FORTUNATELY for our reputation, the manager did not expect an answer; at any rate he didn't allow us time to give one, but continued about as follows:

"First I decided to give the various machine manufacturers opportunity to make test runs, but after investigating, I learned that such tests generally proved that one of the machine runners making the test was head and shoulders above the others, so that as to the actual merits of the machines little could be learned.

"Then I decided to make inquiry as to the cost of upkeep on the different makes, but here again I got nowhere. None of the users of the machines were willing to furnish me with copies of their cost sheets. They volunteered certain figures, but I had no common basis for comparison. I was forcibly reminded of the fact that I have never been very cordial myself toward my neighbors when they sent in requests for information which I considered private property, and this had reference to cost sheets particularly.

"Then it occurred to me that it wasn't necessary to get such cost figures; the companies whose figures I so earnestly desired must surely profit by their own experiences and all that would be necessary would be to watch the purchases of these large companies with years of experience to guide them. But here again I found that I was on the wrong track.

"Three companies, having identical conditions, favored three different machines; a little questioning indicated that in one case salesmanship was the deciding factor, in another a prejudiced master mechanic and in the third the manufacturer of one of the machines was a large customer of the mining company.

"And so it goes; every one has a different idea and a different standard for comparison."

We were on the verge of suggesting that every one has a peculiar way of gathering information and weighing and considering it after it has been gathered.

But our friend came at us suddenly with this: "If there were only one make of mining machine on the market that could be called a success, do you suppose I could afford to adopt it and thereby place myself entirely at the mercy of a single manufacturer?"

We didn't know, and we still don't know. We wonder if the makers know and if they do know would they tell?

Mining Coal with Friable Roof and Soft Floor*

By Fred C. Keighley†

SYNOPSIS—This paper is reproduced because we believe it the last monograph written by the author, who died Apr. 14 of this year. Mr. Keighley had a large experience in mining coal which had not only undesirable roof and floor, but was in addition quite friable itself.

The coking coal known variously as the No. 8, Pittsburgh or Connellsville seam has in places an extremely bad roof. This difficulty is strongly marked in the Connellsville basin, but can be found in other troughs.

In those parts of the area where operations have been conducted for many years it has been noticed that the bad roof usually appears wherever a valley traverses the surface of the coal field. It seems that this is true regardless of the depth of the coal. The bad roof appears whether the coal lies at a depth of 100 or of 600 ft. below the surface.

Why Roof under Hills Is Sometimes Weak

As a rule when the coal seam lies under the plateaus or hills, the roof over the coal is good, and this is true till the coal seam is at a depth of 300 to 400 ft. Thereafter the friability of the roof seems to increase with depth, and thus in many of the mines the roof is somewhat generally brittle. This characteristic seems to be independent of surface topography, and possibly there are three ways in which to explain it:

1. At greater depths there is an increased strain on the strata when mining operations are under way, and possibly the material so burdened fractures and becomes more or less disintegrated. At shallow depths this would not occur.

2. In some cases the first covering of the coal may have been swept away by subsequent erosion and the coal covered later by a deposit of weaker material than that of which the first covering was comprised.

3. In other cases, the friability may arise from conditions which existed when the measures were even deeper than they are now. In other words, the roof was weakened before erosion had carved out the valleys and rounded the hills.

But whatever the cause, the Connellsville seam must be worked exhaustively if there are to be any profits from mining it. The thickness of the coal and its softness might lead one to anticipate that it could be mined cheaply, but the friable roof creates a difficulty which its other qualities cannot overbalance. Much of the coal of the Connellsville region is mined by pick only, and the scale of wages is lower than in other regions where the coal is harder and more difficult to mine. Yet owing to the conditions noted the mining cost is not low.

Many plans have been adopted for mining the coal with the minimum expense where the roof conditions are unfavorable, but no plan seems to be a great improvement over the ordinary methods when everything is considered.

I have had charge of Connellsville coking-coal mines for about 33 years, and all these workings had some areas with bad roof. I have projected workings at depths ranging from 200 to 700 ft., using a dozen or more different schemes, and have never found any marked difficulty in protecting the main headings and air-courses of any mine. But I have experienced some trouble occasionally in protecting the branch, or butt, headings, and I have always had more or less trouble with the rib coal in the rooms.

The Difficulties Are Largely in Rooms

It is true that in many cases the roof will fall in headings and air-courses in spite of all that can be done, but such falls are gradual and are removed as part of the regular mine operations. On the other hand, when falls occur in the rooms they often come suddenly and cover a large area and the break extends so far above the coal that they often reduce and may entirely cut off the production from a certain section of the mine, not only for a day, but perhaps for weeks at a time.

It is clear, then, that any improved method of mining must provide for the protection of the rooms rather than for the care of the headings. Before considering methods that may be improvements on present systems, I would say that I have tried and have seen tried plans such as are outlined in the following paragraphs.

Panels have been projected 1000 ft. wide and 2000 to 4000 ft. long. These constituted what miners term a "pair of flats" because the hauling road and its parallels which traverse the panel by its longer distance are driven on a low grade or on a level. This also results in the Connellsville region in their being driven on the face of the coal.

Such a panel is subdivided into a number of smaller panels that are themselves served by two parallel entries driven at right angles or at some other angle to the flat or face heading depending on the pitch of the coal. These are known as butt headings. These sub-panels are generally 1000 ft. long and 300 to 600 ft. wide. They are divided into a number of working-places known as rooms, and the driving of these leaves strips of coal known as ribs. The number of rooms turned off the butt headings of one of these subdivisions determines in a large degree the size of the pillars, or ribs, left between the rooms.

The rooms being projected from headings driven on the butt of the coal are themselves worked on the face of the seam. They are laid out 40, 50, 60, 80 or 100 ft. apart. As the rooms are generally made 10 ft. wide, the ribs are 30, 40, 50, 70 and 90 ft. thick. The mining code of Pennsylvania requires that airways be driven across from room to room at distances which must not exceed 105 ft. Thus the mine is cut into blocks which cannot measure more than 105 ft. in their smaller dimension.

Various widths have been chosen for rooms with 8 to 30 ft. as limits, but the general belief is that rooms and headings should be driven 10 ft. wide in the Connellsville re-

*Paper read before the West Virginia Coal Mining Institute at its winter session, Dec. 10, 1914.

†Late general superintendent of mines, Oliver & Snyder Steel Co., Uniontown, Penn.

gion. There seems to be no opportunity to improve on this width. The best work has been obtained with large room ribs—50, 70 and 90 ft. thick; but the success has not been as great as might be expected, though, with room ribs of the two larger dimensions, and with any ordinary care in mining a general creep or squeeze cannot occur.

This is not true when room ribs are made of smaller dimensions, such as 30, 40 or even 50 ft. In the initial stage of rib drawing with such light ribs great success is secured, but when trouble occurs it is usually in the form of a general squeeze or creep that almost paralyzes the output. It has often seemed for a time that the small ribs in the rooms resulted in cheaper mining; but when a squeeze or creep took place the small rib did not permit of the driving of a new road with safety and profit, and consequently the coal remaining in the rib could not be taken out.

With 70-, 80- or 90-ft. ribs there is always sufficient coal left to permit driving a new road with safety through the pillar no matter how badly the roof may have fallen or the coal be shattered on the edges of the pillars. Sometimes a skip off the rib is taken in place of a split, but in any case splitting or skipping of the large ribs entails the use of much timber.

Wide Pillars Certainly Pay Where Coal Is Thick

It is often said that if the extra time and expense of laying out workings with large rib dimensions and the heavy cost of timber were all taken into consideration it is doubtful whether the wide rib would after all be any more profitable than the narrow rib except that a great yield would be obtained per acre. When, however, coal such as the Connellsville seam brings from $2500 to $3500 per acre, it certainly does not pay to lose any of it.

Nearly all experienced miners concede that with narrow ribs only 50 per cent. of the coal is recovered. The best result claimed is 65 per cent., while 90 and 95 per cent. has often been recovered with the larger-rib system. The problem is whether the heavy cost of timber and the still greater cost of labor will counterbalance the loss of from 35 to 50 per cent. of coal. I am disposed to believe that the larger rib, making a larger yield possible, will assure a handsome margin.

Cost of Timbering Is the Main Problem

But I have been puzzled for some time, not so much on the way in which ribs may be made larger, but on the saving of timbering. It must be remembered that the timber and timber work do not represent the whole of the cost of mining rib coal under the conditions which I have stated. It often happens that the removing of falls involves as much expense as first timbering, for not only does the timber have to be reset, but more timber is required.

In other words, an advancing room or the space in front of a rib which is being drawn may cave in and remain quiescent for perhaps a whole year, yet when the débris is removed new falls may occur and the timber may have to be renewed throughout. I have known this to be done several times, and the bottom has had to be ripped every time before a satisfactory tonnage per acre could be obtained.

Reviewing the general conditions to which I have referred and passing judgment on them, I think the following statement can safely be made: Whether the rooms be narrow or wide and the pillars thin or thick under the friable roof of certain portions of the Connellsville coke region the fall of the roof will be equally widespread, and when the room ribs are small sooner or later a general squeeze or creep will take place. With larger ribs the roof will fall and the bottom will heave, but there will be no general squeeze. So it would appear that if the roof must come down, perhaps it would be best for us to take its fall for granted and to make up our minds to let these falls take place when conditions are suited. We should assist the roof, if possible, to come down.

Roof Weakened Far Back of Rib Line

I and others have noticed that after a series of falls have taken place in rib workings the roof conditions appear for a limited time to be much better over the coal

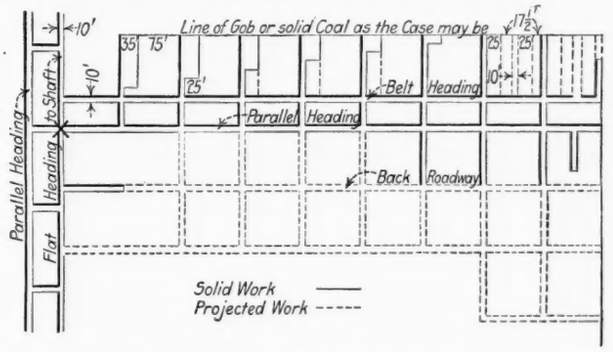


Fig. 1. Keighley's Plan to Avoid Expense in Timbering

remaining unworked in the ribs. Some relief seems to have been given to the overlying measures by the falls, and I depend on this very fact for the operation of my proposed method of working coal having a friable roof and a soft floor.

Moreover, falls in rib workings appear to occur in layers. In deep mines after the ribs have been drawn back 100 to 200 ft. from the point where the rib drawing started and a general fall or movement of the roof occurs, the rupture or disturbance does not run up more than from 5 to 30 ft. above the coal. Very often such falls not only take place in the large open spaces where the coal has been withdrawn entirely, but extend into the roof of both rooms and crosscuts for 100 or more feet back from the rib line. Sometimes this resulting weakness may cause falls for several hundred feet.

In coal having 500 or more feet of cover after these falls are cleaned up and rib drawing proceeds as far as 400 or 500 ft., there will be another general fall which seems to reach up 100 ft. or more above the coal and often to the surface. When this occurs it not only breaks the timber at the working-places, but often crushes it several hundred feet away. The timber will often begin to crush several weeks before the fall occurs.

If the cover is 400 to 600 ft. thick and the coal has been thoroughly mined when the rib drawing reaches a point say 1000 ft. from the starting point, the rib work is not nearly so troublesome or expensive, but still there is room for improvement.

These are the conditions which must be considered, and I have schemed the following method of removing the difficulties described. It is illustrated in Fig. 1. Drive an entry or passageway 10 ft. wide at right angles to

the flat or face headings. This will run on the butts of the coal and parallel to the edge of the area to be worked by this entry, being distant in the clear 105 ft. at all points. This entry would of course be driven at a different angle if the pitch of the coal would not permit of driving directly on the butt.

A second parallel passageway similar to the one described should be driven 50 ft. from it in the clear. With the conditions as in the illustration, this heading should be placed on the right-hand side of the entry as driven. It will be termed in this description the "parallel heading." Crosscuts should be cut between the two at distances of 105 ft. in the clear.

These roadways may be termed a pair of butt headings, and they may be driven 1050 ft. in addition to the distance allowed for the pillar flanking the face entries, a pair of which will ultimately be driven beyond the butt headings now discussed. In addition they must be long enough to provide a flanking pillar for the face entries from which

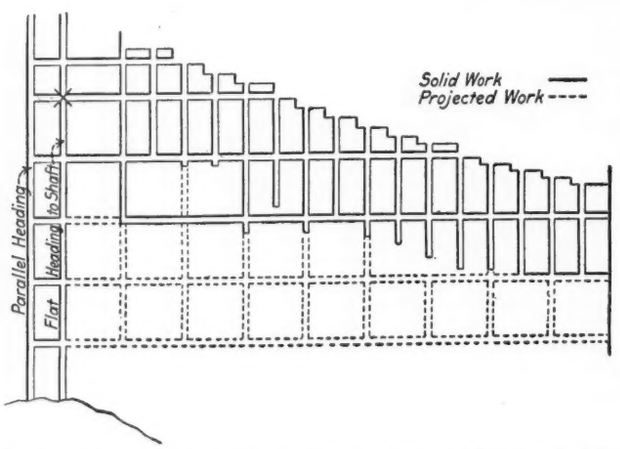


FIG. 2. THE SAME PLAN AFTER IT HAS REACHED ITS FULL DEVELOPMENT

they are driven. This of course applies only to coal of light pitch. When the pitches are steeper the distance must be shortened.

HOW THE ROOMS ARE DRIVEN AND PILLARS DRAWN

Rooms are turned to the left of the first butt heading, these being spaced at 52½-ft. centers. Thus there will be 20 rooms in the butt heading. The first room turned is to be driven up its distance of 105 ft., then 25 ft. of the rib of that room is to be worked back to within 30 ft. of the butt headings, thus leaving a road rib of 17½ ft. for the room above when it is worked. The next room is not to be turned until the second stage of working is reached. In other words, every other room will be worked forward and drawn back as just stated.

The alternate rooms will not be driven until the upper end of the 1050-ft. section is reached. Then these will be turned off successively from the top down, keeping pace with the drawing of the butt-heading stumps as they are withdrawn down toward the foot of the panel.

The rooms on the parallel butt heading will remain undriven until the latter is in a distance of 600 ft. At this point, which will be termed the "600-ft. point," a roadway should be turned off. This will be termed the "600-ft. roadway." It will be driven 105 ft. and at the end of that distance will be turned to the left so as to form an entry on the butts of the coal parallel to the other butt heading and 105 ft. away in the clear. This will be driven to the end of the panel and will be called in this description the "back roadway."

From the 600-ft. point to the limit of the panel on the parallel heading, rooms will be turned to the right at 52½-ft. centers. These will intersect the back roadway. Each room will be 105 ft. long. As soon as the last room is driven through, the coal from the rib work will be hauled down the back roadway through the 600-ft. roadway and thence down either the parallel or the butt heading as may appear best. When the retreating rib work has reached the 600-ft. roadway, another back roadway will be driven upward from the first room of the parallel heading.

BREAKING LINE IS DULY STEPPED

Sketch No. 2 shows the workings when further developed and after rib drawing has been started at the top of the 1050-ft. panel. It will be noted that the work proceeds in steps, as is the general practice in well-ordered rib drawings. It will be seen that, by this arrangement of headings and roadways, crosscuts (except those between the butt heading and its parallel) are entirely eliminated, the back roadways taking their place and being driven as required by the advance of the rib work. Of course, the crosscuts cannot be eliminated between the butt heading and its parallel.

LOWER ROOF IS PERMITTED TO FALL

The object of driving the alternate rooms to the left of the butt heading and drawing out a 25-ft. skip from the pillars is to allow the lower roof to fall. In a panel of 20 rooms 10 would be driven up and drawn, and I believe that the fall of the roof provided by this method of mining would relieve the tension under which a friable roof with soft bottom is usually found when rooms are first driven.

The purpose of laying out blocks 105 ft. square is to avoid conflicts with the mining law of Pennsylvania, as that is the distance beyond which places cannot be driven without providing crosscuts. Perhaps some will wonder that a mining man should wish to avoid the driving of crosscuts, and I admit the care taken to avoid making them has a somewhat "shady look"; but my experience, with that of others, is that crosscuts are a prolific source of roof and floor trouble and one of the principal causes of crush or creep. Many accidents occur because coal and slate fall from both roof and sides where the material which falls has been weakened by the presence of these crosscuts.

TROUBLES WHEN CROSSCUTS ARE REACHED

In rib-work we invariably have much trouble when approaching an old crosscut. The lower roof has nearly always fallen and much slate has to be handled. By my method there would be no crosscuts driven except those from the butt heading to its parallel, and they can be protected by timber work. The rib drawing by this method is all in one direction and *en echelon,* and I think the plan will lower the cost of producing coal whenever covered by a friable roof and supported by a soft bottom. It will also be of value where the roof is friable and the floor is hard.

The work can be developed much faster by my method than by any other because once the upper limit of the panel

has been reached there are many points of attack. Moreover, it is not necessary to develop continually by butt headings as the result may be obtained through the driving of 105-ft. places and the extension of back roadways to intersect.

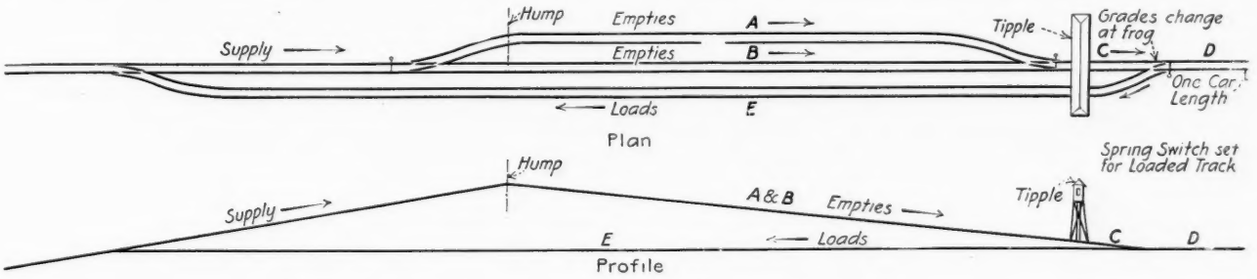
Of course care must be taken not to overdevelop the mine, as under those circumstances the places will stand too long. The system which I propose is elastic, and with good judgment much heading work and consequent driving of crosscuts can be avoided. The so-called back roadways are in a sense crosscuts, but in reality they are haulage roads and airways. They stand open only a short time as compared with the butt headings and parallels in the mines of the Connellsville region. These stand sometimes for as much as 10 years.

Nor is there any need to leave rooms to stand, as under present methods, for years before the ribs are withdrawn. It is no uncommon condition for rooms to be left standing almost as long as the headings. Such delays in room-rib drawing invariably result in the breaking of the posts, timbers and lower roof and entail enormous expense for cleaning up and retimbering the workings.

A Plan for Tipple Tracks

By V. S. Veazey*

It is often impossible to obtain room for a tail track above the tipple location, because the latter sometimes is necessarily situated near the head of a stream or other physical obstacle. The accompanying illustration shows an arrangement which can be adapted to any case where such a condition exists.



Track Arrangement Where a Tail Track Is Impractical

The general plan of operation in the scheme shown in the sketch is to place the empty railroad cars on tracks *A* and *B*. These cars are dropped one at a time downgrade to the tipple, where they are loaded and afterward run by gravity down the grade *C* about 100 ft. In going down track *C*, the cars attain a sufficient momentum or speed to carry them up the grade *D* through a spring switch. Here they come to a stop and run back by gravity down the loaded track *E*.

The railroad locomotive pushes the empties up the supply track and over the knuckle onto tracks *A* and *B*. The locomotive then returns and goes onto track *E*, where it picks up the loaded cars.

The passage of the compensation bill through the Pennsylvania Senate on May 19 was highly gratifying to all the miners and most of the operators. W. W. Inglis, of the Pennsylvania Coal Co., expressed his approval of its passage.

*Chief engineer, McKell Coal & Coke Co., Glen Jean, W. Va.

How the Chinese Mine Coal

William Barclay Parsons in an address before the Franklin Institute states:

China's mineral wealth is both varied and abundant, and, fortunately, coal is found in great quantities through almost the whole country; in fact, there is scarcely one of the 18 provinces that does not contain coal in paying quantities. Through lack of extensive railways and of power-consuming industries and on account of the great poverty of the people, the consumption of coal per capita is very small. There are a few factories, of course, at Shanghai and other treaty ports, but coal is not in demand otherwise for manufacturing purposes. Nevertheless, about 15,000,000 tons are produced annually from Chinese mines.

The Chinese native mine is a singular affair. The native attacks the bed at the outcrop and usually, for some unknown reason, at a point where the measures are dipping into the hill. He drives a small tunnel not over 5 ft. high and not more than 4 ft. wide, so as to avoid timbering. This he extends downward till his native pump can no longer handle the inflow of water. At that point the mine is considered worked out and is abandoned.

From the initial drift there are no side galleries and no rooms. On the floor of the drift are laid two longitudinal timbers like rails. The coal is loaded into wicker baskets and then hauled up the narrow passage on these rails by manual power. In the native mines of Hunan which Mr. Parsons visited light was secured by burning joss-sticks of punk, giving of course nothing but a faint glow.

Much of the Chinese coal will coke. Some of the anthracite is sufficiently hard and firm to stand the burden of a blast furnace, though nearly all is much softer than its American namesake, but similar in chemical composition. Much of the bituminous coal has a large percentage of ash, and very much of it is so friable as to produce only a small proportion of lump.

When the coal deposits are worked on a large scale it will undoubtedly be found advantageous throughout China to crush most of the coal, wash it and convert it into coke or compress it into briquettes. The natives are already briquetting coal, taking the coal dust, mixing it with clay and selling the coal balls in Chinese cities for local consumption.

By washing the coal from the Ping Hsiang mines, from which is made the coke for the Hankow iron works, the ash content is reduced from 28 to 8 per cent. and the sulphur from 0.65 to 0.1 per cent.

New Tipple at Havaco, W. Va.

By H. Reisser*

SYNOPSIS—An uptodate tipple and power plant, designed and constructed to secure a high quality product with an equipment as nearly fireproof as possible.

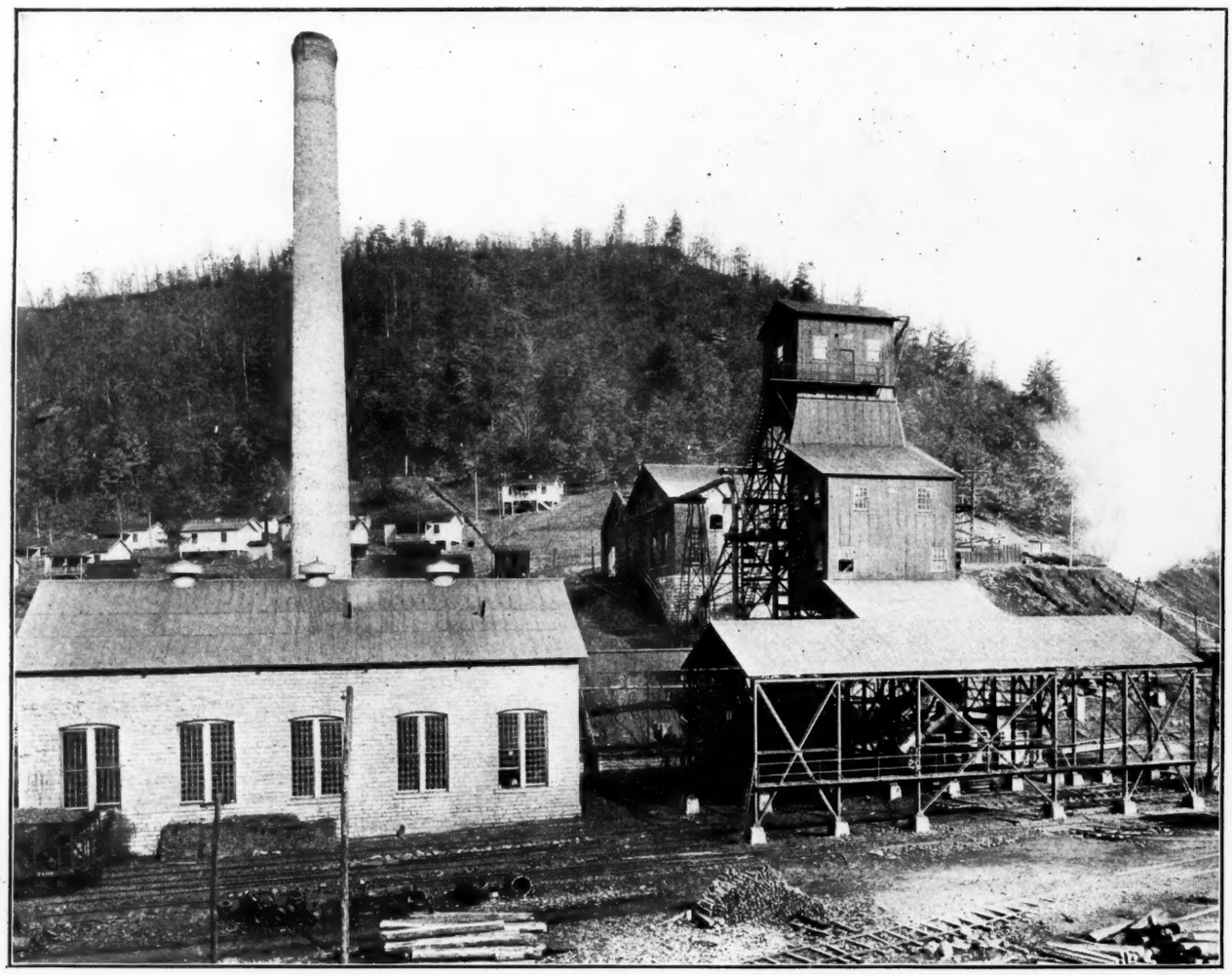
A recent article in Coal Age explained in detail how thoroughly and efficiently the concrete work for both the fan and the cage shafts of the New River & Pocahontas Consolidated Coal Co.'s operation at Havaco, W. Va., were constructed. This article outlines the work done in connection with the plant aboveground, describing in detail the tipple which loads the coal into railroad cars, the power house, the boiler house and the hoist house.

The mine is situated at Havaco, about two miles from Welch, on the Tug River branch of the Norfolk & Western R.R., and is in the heart of the Pocahontas region. The coal needs no further mention, except that it is known to the trade generally as being the best steaming coal so far discovered.

*Engineer, Link-Belt Co., Nicetown, Philadelphia, Penn.

The shaft was driven at a point such that all coal is taken away on the rise, and extends downward some 285 ft. from the surface to the coal bed. By doing this two important things were accomplished: 1. All drainage can be accumulated at one central pumping station by gravity. 2. The loaded mine cars are all brought to the loading point on favorable grades, thus minimizing the haulage expense.

The seam of coal known as Pocahontas No. 3 is about 5 ft. 6 in. thick and runs uniform in height, allowing the use of large mine cars holding three tons each. Electric locomotives are employed to gather the cars and bring them in about 30-car trips to the shaft bottom.



General View of the Tipple and Power Plant

In order that no congestion may occur at the loading point where the cars are put on the cages, double loaded tracks have been constructed, and the cars are loaded singly onto the cages by gravity. This double-trackage system extends back for a distance of some 400 ft., and the roof of the coal bed is supported by 15-in. steel I-beams, placed at 36 in. centers. The same construction is followed for the empty return track for about 150 ft.

where the trips are again made up by gravity preparatory to being returned to the working rooms.

It is a well-known policy of this company, of which Howard M. Bertolet is the general superintendent, to secure two essentials in all its operations: 1. Quality is to be primarily considered. 2. Equipment must be as near fireproof as possible.

The tipple is placed immediately over the shaft and is constructed of steel throughout, wood being used at no point except for runways at the side of the railroad cars for the use of the loaders. All other floors, walks, stairways, etc., are made of diamond-checkered steel plates.

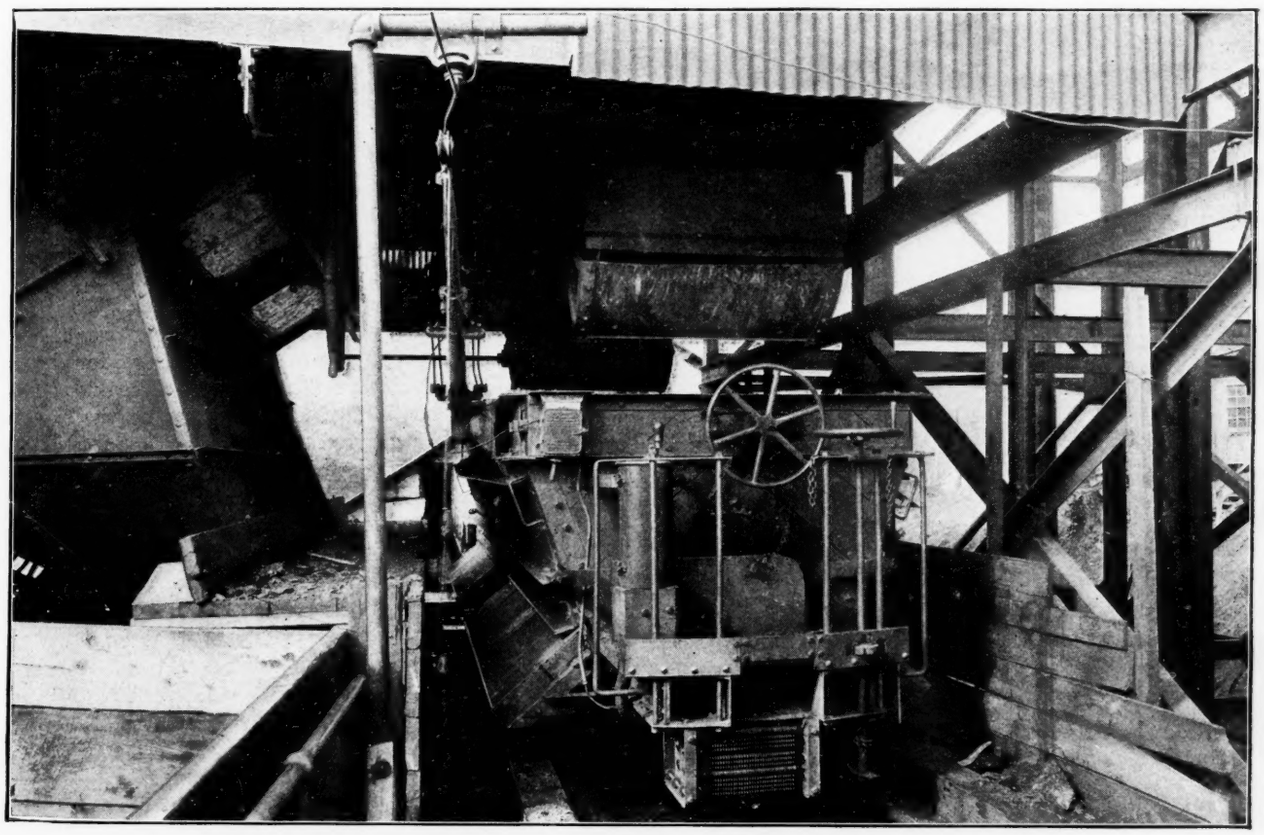
Lepley Cages Are Employed

The Lepley patent self-dumping safety cage, probably the heaviest device of its kind manufactured, is employed to carry the mine cars from the shaft bottom to the elevation of the dumping point. The cars are held in the cage by steel-plate horns, readily opened by the attendant at the foot, to release the empty car and fasten the loaded one preparatory to its being hoisted. As the loaded car reaches the dumping point, it is gradually tilted to an angle of 45 deg., the end gate on the car being automatically opened, so that the only function of the attendant at the top is to inspect the coal and remove the check of the miner from the car and pass it on to the weighmaster in the scale room.

At the top of the structure the 8-ft. diameter bicycle sheaves are placed. These are constructed of heavy cast-iron rims carrying deep V-grooves and connected to the hub centers by steel spokes. In them travels the 1⅜-in. cable, which is attached to the cages at one end and to the hoisting drums at the other, lowering and raising the cages to their respective terminals.

From the cars the coal is discharged into a heavy plate-steel dump hopper, from which it passes into the weigh baskets. Each weigh basket is connected with a 10-ton suspension scale by adjustable forged-steel hanger rods, while the beams are placed in a separate room directly above, in which the weighmaster both records the weight and controls the operation of the basket gates, allowing the coal to move on when released. After leaving the weigh baskets the coal passes over sections of gravity bar screens suspended by hanger rods. These are unveiled, allowing ¾-in. slack coal to pass into hoppers for boiler-house fuel, which when filled close up the spaces between the bars, allowing all coal to pass over them. In this manner boiler fuel is always stored automatically and needs no attention.

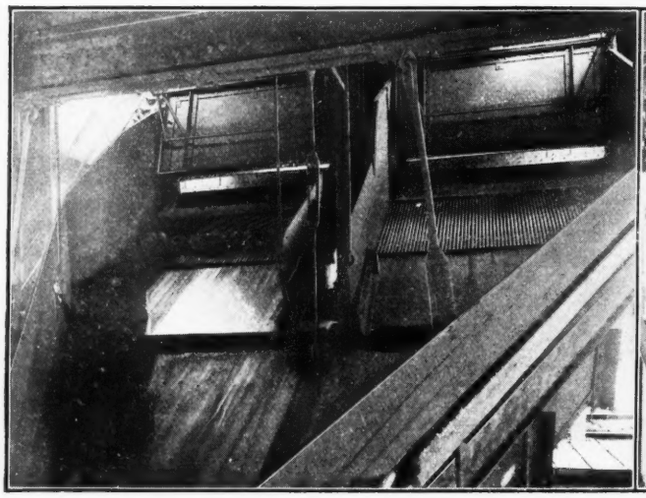
A tapered gathering chute, suspended below the screens, centers the coal, discharging it into a double spiral chute, which is provided with a fly gate so that coal may be loaded onto either of two railroad tracks below. A chop gate placed at the end of the spiral chutes allows the railroad cars to be changed when full without spilling the coal onto the tracks. Steel hinged extension chutes are attached to the ends of the chutes and are controlled by hand and geared winches from the loader walks so that high as well as low railroad cars can be filled with minimum drop for the coal.



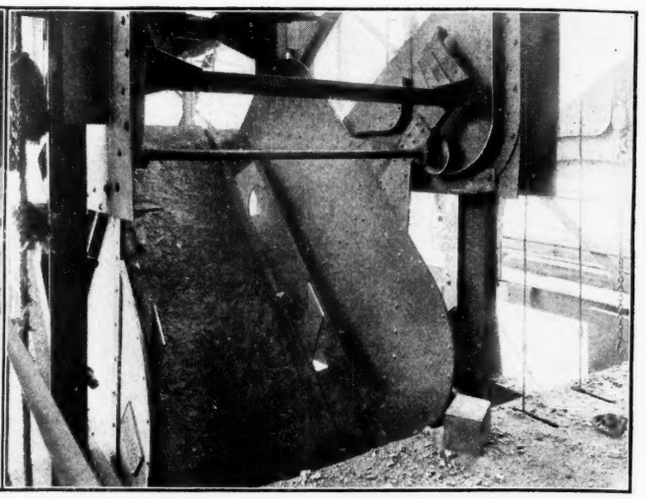
The Self-Propelling Rock Car and Trailer under the Rock Chutes

Self-Propelling Rock Car Handles the Refuse

The ever-present and important problem of disposing of rock and slate is solved as follows: In the dump hop-



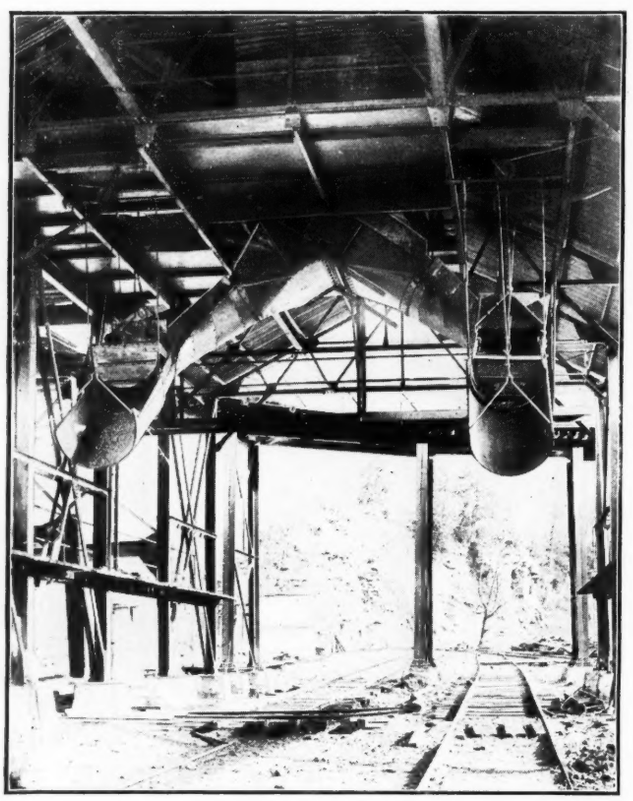
SUSPENDED SCREENS FOR BOILER FUEL



LEPLEY CAGE IN DISCHARGING POSITION

pers, fly gates are provided, which are thrown open when rock is hoisted. Directly under these gates is placed a common rock bin of about 20 tons' capacity. This is constructed of heavy plate steel and is reinforced with I-beams placed at close centers under the plates. The discharge of rock is controlled at two points by Link-Belt undercut gates.

A feature of the completeness of this plant is the Link-Belt power-driven side-dump rock car with its trailer, each designed to hold seven tons of rock. The discharge points of the rock bin are so placed that they are central over the rock cars when they are coupled together. These cars are built of a skeleton steel frame lined with oak planking on which are placed steel lining plates. They



LOADING CHUTES ABOVE TWO RAILROAD TRACKS

are mounted on 24-in. car wheels with roller bearings. The power car is fitted with a 25-hp., series-wound, interpole, ball-bearing, variable-speed motor, with incased gearing and controlled by a drum situated on the back platform of the car. This car has a speed of from 10 to 15 mi. per hr.

The control of the side-dump gate is also located on this platform, while the control of the trailer gate is located on the front platform so that the attendant, in addition to running the cars, can operate the gates of both without moving from his position.

An elevated structural-steel trestle extending over the loading tracks to the rock pile forms the runway for the cars, and as the pile reaches the elevation of the tracks they are extended indefinitely, the rock forming the ballast beyond the end of the trestle.

For safety, the entire shaft opening is surrounded at surface elevation by a steel-picket fence with gates which are kept locked. Supplies are taken into the mine at this elevation, and at such times the empty cages rest on sets of cast-steel landing dogs which are thrown in place by an attendant.

The entire tipple structure is constructed of solid steel members, giving easy accessibility for painting. Steel loading sheds over the railroad cars extend both in front of and behind the tipple center line for 60 ft., providing protection for the car loaders in bad weather.

TROLLEY BEAMS ARE PLACED WHERE NEEDED

Trolley beams with geared trolleys are placed both at the top of the sheave house and over the screens and chutes below, their function being to facilitate the quick removal of sheaves from the top of the building to the ground or any machinery needing repairs. The building is covered with corrugated iron roofing and siding and is provided with a maximum amount of light, necessary walks, stairways, etc.

The tipple complete, including the power rock car and the boiler-house fuel system, was designed and erected by the Link-Belt Co., of Philadelphia, Chicago and Indianapolis.

No picking of coal aboveground is considered, it being cleaned in the mine as it is loaded. Inspection of the coal occurs both at a point where it is dumped and as it passes into the railroad car.

The power house, which is constructed of stone, adjoins the tipple at a distance of about 60 ft. The roof is constructed of steel framework covered with corrugated iron. This building is well lighted and ventilated. The floor around the boilers is of concrete.

The boiler house contains two 300-hp. Stirling boilers with underfeed stokers and Williams automatic feed-water regulators. The boilers are connected to the brick chimney, which is 150 ft. high, by steel-plate breechings. The stokers are supplied with coal as follows: The slack hoppers under the screens in the tipple discharge the slack coal into a conveyor consisting of malleable-iron flights suspended on a single strand of chain traveling in a steel trough. This extends upward from the tipple and over a set of steel hoppers holding three tons of coal each, located directly in front of and above the boilers. By means of chutes and gates, coal is automatically fed into the receiving hoppers of the stokers.

The generating equipment comprises two 150-kw. steam-driven units and one 300-kw. motor-generator set, power for this latter unit being received from the Appalachian Power Co.'s system, which is fast being extended throughout this region.

The brick hoist house is located directly behind the batter posts of the tipple. It contains the two 24x42-in. Vulcan steam engines, which are direct-connected to two 10x8-ft. conical drums. The attendant has a dial in front of him with a pointer mounted thereon, showing him at all times just what position the cages are in, from which he is able to determine exactly where to stop the engines.

O. M. Knouff is the superintendent of this mine, assisted by J. L. Ascough as mine foreman and R. M. Lambie as fireboss.

Extracts from a Superintendent's Diary

Today has been a Blue Monday. Things began to happen early. In attempting to start the hoisting engine at No. 2 shaft this morning the engineer wrenched one of the cylinders entirely free from the guide barrel and we won't be able to hoist another ton of coal for several days at best.

Last Saturday was payday, so the engine had been standing nearly two days and quite a quantity of water had condensed in the steam line between the throttle and the separator. For some unaccountable reason the enginer gave the engine full steam on the first stroke and the water did the rest.

As soon as I learned of the accident my impulse was to discharge the engineer, but on second thought I decided that he would be the last man on earth to tear up another engine, so I changed my mind. Several years ago we had a similar accident, and I paid the engineer off and ordered him out of camp as soon as I became convinced of the cause of the accident. Had he been retained, today's accident would probably not have occurred.

In recalling that occurrence of several years ago, I am reminded that the engineer was not the only one who lost prestige on account of that accident. My experience along mechanical lines had been rather limited and the possibility of wrecking a hoisting engine with a slug of water had never occurred to me.

The engineer took advantage of my ignorance and after the accident insisted that a flaw in the engine casting coupled with a poorly designed frame was responsible for the accident. His contention looked reasonable enough, so I hurried to the office and sent a long telegram to the builder describing the break, and to insure proper consideration, I intimated in the message that they would not get a look-in on future purchases of our company unless they adjusted the matter promptly and to our entire satisfaction.

The president of the engine company arrived in our camp the following day, in answer to my telegram, and he was accompanied by the president of our company. They lived in the same city—in fact were neighbors.

The hoisting engineer and myself were still examining the wrecked machine, wondering how we might make a temporary patch, when the two presidents arrived. After introductions all around, Mr. Avery, of the engine company, took our engineer in hand and began to ask questions.

Did the accident happen on the first trip Monday morning? Had the engine been standing since Saturday afternoon? Did he start up slowly and listen for water? Did he suppose that the relief valves could relieve a cylinder full of water? The hoisting engineer was game enough, but he realized that the whole truth would have to come, so he made a clean breast of it and admitted that water was the cause of the accident.

That satisfied Mr. Avery, but the president of our company, Mr. Small, was far from satisfied; what he wanted to know was why it had been necessary to bring Mr. Avery all that distance to do our investigating.

Mr. Avery, realizing no doubt that Mr. Small was in a fair way of becoming fretted, came to my rescue. He assured Mr. Small that a superintendent couldn't be expected to know as much about a hoist as the hoist builder, and as a matter of course the first thing that suggested itself to any man having trouble with a hoist was a telegram to the builder. I still feel friendly toward him.

The Teton Basin, Idaho, Coal Field

From time to time during the last six or eight years there have been persistent rumors that a large field of high-grade coal lies southeast of St. Anthony, Idaho. As the development of such a field would be of great advantage to a large tributary region containing extensive mining and agricultural developments, and as samples from the field seemed to corroborate the rumor regarding the quality of the coal, E. G. Woodruff, of the U. S. Geological Survey, made an examination of the field to determine its prospective value.

He found that the reports concerning the quality of the coal were substantially correct, but that the beds are so broken by faults and the area known to be underlain by the beds is so small that the field will probably never supply more than the local market and cannot become a factor in the development of the general region of the Snake River Valley. His report has been published as Bulletin 541-I, a copy of which may be obtained free on application to the Director of the Geological Survey, Washington, D. C.

Mining Laws and Legislation

SYNOPSIS—An address delivered by J. T. Beard at the semiannual meeting of the Kentucky Mining Institute, held at Louisville, Ky., Dec. 4 and 5, 1914. General review of efforts made to improve mining conditions. Deficiency of state mining laws in respect to the clear and specific definition of terms used in the law describing mining conditions and requirements. The need of an equable classification of mines. Mining examinations and certification of mine officials.

Mr. President and members of the Kentucky Mining Institute: I always consider it a great privilege to be asked to address a mining institute or any gathering of men who are greatly interested in the many subjects of economic mining. The very fact that you have an institute here in Kentucky—the fact of its existence is evidence of the progressiveness of Kentucky along the line of intelligent, economic and safe mining. We have been, as you know, for many years endeavoring to improve mining conditions, which at the best are arduous. We have of late years done a great deal in the way of first-aid and educational work.

It seems to me that in our efforts to improve mining conditions we frequently view the subject too much from our own standpoint. The operator is prone to consider the economic aspect as most important and in doing this is brought face to face with the problem of rightly informing his officials and the men in charge of the work. But he often goes further than that. Many companies, as you know, have undertaken sociological work and have done much to improve mining conditions both in the home surroundings of their men and in their educational advantages. They have accomplished much in that respect, and great credit is due them for their efforts.

When your secretary wrote me some time ago and asked me to prepare a paper for this meeting, he gave me the privilege of selecting my own subject. I wrote him that I would not be able to undertake the preparation of a paper with the work already in hand; but would be glad to help in any way I could in pushing along such work as you gentlemen are doing. I wrote him that I would be glad to give a brief address along the line in which I had been interested lately.

Intelligent Control of Mining Conditions

Referring to this question of improvement, it seems to me that, while we are interested deeply in educational, first-aid and sociological work and the improvement of social conditions among the men, mine laborers and mine workers, we overlook what might be called a fundamental element; and that is, using proper means to put our operations under such conditions that they can be intelligently controlled. This thought brings us at once to the consideration of existing mining laws and mine regulations and needed mine legislation.

Many of our states have admirable mining laws in some particulars, while in others they are not so good; and yet there is scarcely a single state whose mine laws are anywhere near perfect. They sometimes err, and perhaps chiefly so in not being *specific* in the definition of the terms used in the laws. They err again in not giving sufficient authority to the men—the officers whose duty it is to see that the laws are enforced. I may say that this is one of the greatest difficulties that confronts the mine inspectors in the state of Pennsylvania today. According to the testimony of the majority of state mine inspectors, it happens frequently that when they attempt to enforce a law standing on the statute books they find themselves helpless to do so. It often occurs that either the influence of politics, controlling or restraining the court, or some technicality in the wording of the law renders them helpless to enforce the very law that in their judgment should be enforced in order to make the mine safe.

Uniform Publication of State Mining Laws

Recently I have been looking through the mining laws of the different states; and just here I want to make the suggestion, gentlemen, that all mining laws should be printed in such a shape that they can be distributed and carried about in a small convenient form. So many of these state laws are printed in a large and bulky shape. Your law in Kentucky is in a convenient form; but the laws of many of our states are published in a form that cannot be distributed. This is not the fault of the mining department, but is largely due to a lack of appropriation to print the laws or to print them separate from other reports. I remember that a few years ago the laws of Alabama could be obtained only in such a large or bulky form that it could not be carried around or referred to conveniently.

Many of the state laws are not indexed, so that we find when we undertake to look up a particular question there is no way to refer to it and find it quickly. The mining law of Tennessee has a marginal index. I want to compliment you gentlemen and particularly your chief, Professor Norwood, on the indexing of the Kentucky mining laws. I believe I have never picked up a pamphlet of mining law that is so well indexed as this mining law of Kentucky.

Need of Specific and Clear Definition of Terms

Speaking of the lack of specificness and clearness in the definition of terms in mining laws, I want to refer briefly to one or two points, though many others will occur to you gentlemen. As I told your secretary, I think that more can be gained by a heart-to-heart discussion of mining laws, or of any subject for that matter, than can be gathered from the reading of a prepared paper. One point worthy of careful consideration, in respect to improving our laws, is that in relation to clearness of definition. Let me ask, How many of the mining laws of the states clearly define what is meant by a gaseous mine? As you are aware, the laws of the states commonly classify the mines in such a manner that those mines designated as "gaseous mines" are subject to restrictions and measures that call for an increased outlay and increased expense of operation; and these restrictions fall as a burden on the operator if his mine is classed in that category.

Classification of Mines

In many cases, the laws of the state leave the question of what is meant by a "gaseous mine" so indefinite that

it throws the whole burden of classification on the mine inspector. He must say, according to the law, whether or not a mine is a gaseous mine. That difficulty, I believe, exists in your neighboring state of Tennessee. The mines in that state are divided into four different classes, A, B, C and D, and are classified in such a manner that the mine inspector must determine what mines fall in class A, as a gaseous mine, or belong to class B, and also to determine whether or not that mine is more dangerous from having an accumulation of dust. Now, the only distinction that the Tennessee law makes in class A mines is that they generate sufficient gas to be detected on a safety lamp—I believe that is the reading of the law. But I don't think that it states just where or when, thus throwing the whole burden of classification on the inspector.

In your Kentucky law there is a specific classification in that regard. "A gaseous mine is one in which the percentage of explosive gas exceeds three-fourths of 1 per cent. in the return airway of any one split in a dusty mine; or exceeds 1¾ per cent. in the return airway of a split in a non-dusty mine." That is a very good provision and an excellent definition. It gives a specific method for the classification of the mine. The Tennessee law simply says that the mine to be classed as "gaseous" shall generate sufficient gas to be detected on a modern testing lamp, without stating where or how. We all know there are numbers of lamps for testing for gas, some claiming to detect gas as low as one-half of 1 per cent., and others three-fourths of 1 per cent.; and if I read the law rightly, such indications would have to be regarded as determining the classification of a gaseous mine, but subject of course to the final decision and ruling of the mine inspector.

A Practical Illustration

Imagine, gentlemen, for a moment the mine inspector approached by a company. He sees the superintendent or the manager and tells him that he has detected gas—we will say possibly 1 per cent., possibly 1½ per cent. He has detected gas, and it falls under the classification "A." The superintendent calls up his foreman and with the inspector they go below, where the inspector shows them that there is gas. The superintendent explains that it is "only in one place" and after awhile prevails on the inspector to let the classification stand as it is, and the inspector reluctantly complies, as he has that authority. But the conditions change before the time arrives for the next inspection, and that small amount of gas has increased—indeed is coming in other places. Still there is no change in the classification of the mine, and the restrictions with regard to gaseous mines are not made, because the operator is not compelled to meet them.

Of course, we all know that many of these conditions in coal mining throw a burden on the operator; and unless it is necessary for the safe operation of the mine, the law ought not to be so specific as to impose the burden. The first condition in coal mining, however, we must all admit, is to make the operation safe. It is admitted quite generally in print that "safety is the first consideration"; but we know—many of you know that miners are prone to run much risk. Perhaps there is no industry in which the industrial workers themselves are given to taking greater risks than in coal mining. It is therefore a question just how specific the law should be—it is a question for you gentlemen to discuss, to enable you to reach some intelligent and capable understanding, as to what is necessary to make operations in coal mines safe. It is a difficult question; it is a hard question.

In studying this question of law in relation to mining, we must bear in mind one thing and that is when we make a law it must be drafted and enacted in explicit terms, so that an unnecessary burden is not thrown on any one man or class of men. No one appreciates that point more than the mine inspector. No one more than he feels the importance of clearly defined mining laws. When he is called upon to stretch his conscience—when he is called upon to underclassify a mine that he knows and his better judgment tells him should be classified as a "gaseous mine"—when he is urged on one pretext or another to place the mine in the lower class in order that it may be operated at a less expense, the mine inspector would rejoice to have such a specific law as I am talking about.

Mining Examination for Certificates of Competency

As I have said these are difficult questions and I, for one, would not attempt to suggest a solution. They are questions that must be freely discussed and carefully considered. One question of great interest in the same connection is the examination for certificates of competency to act as mine foreman, assistant mine foreman and fireboss. For fifteen years, I believe I held nearly every position in a mine and performed all kinds of mine work except digging and driving. For the past twenty years, my time has been devoted to the education of mining men, particularly mine foremen and firebosses, by classes, by private instruction work, by correspondence and in other ways. I have tried to assist them in some way, if possible, to a more intelligent method of performing their work. Just how much I have accomplished, it is not for me to say. But the matter of examination for certificates of competency is one that comes right home to me. I know what it means to a great many mining men, having been secretary of the Iowa State Examining Board for a number of years.

Let me illustrate: Here is a man who has been serving as mine foreman with more or less success—a good, practical man. But conditions arise in the mine that he is unable to combat, because he doesn't understand them; and he naturally and necessarily endangers not only his own life, but the lives of others working under him, simply through his lack of knowledge. It may seem hard to say that the law should require the examination of mine foremen and their certification because these men are mostly practical men with no knowledge except what they have gained in the mine. But when we look at it from the point of safety it is not so hard, because we know that the conditions of mining in this country and elsewhere have so increased in their danger within the past few years that it is necessary that we should understand more about the *theory* and *principles* of mining.

Changes in Mining Work and Equipment

The equipment of mines has changed wonderfully in recent years. Take the question of installing electricity or the use of gasoline engines and locomotives in mines. We don't all agree on the question of gasoline locomotives for mining use. Many hold that it is the most eco-

nomical machine that can be put into a mine for the purpose of hauling coal. It is certainly very flexible and economical, but it cannot be denied that at times, under conditions incident to mining, it generates a dangerous amount of gas and if the ventilation is deficient becomes a dangerous factor in the mine. It is necessary that mine foremen should better understand these points. It is necessary that they should understand the influence of *dust*. Until recently, how few of our mine foremen have considered dust at all dangerous? Even at the present time I meet many mine foremen who do not regard mine dust in the sense in which it should be regarded.

Some States Hold No Examinations

But speaking of examinations, as we all know, many of the coal-mining states do not have examinations. West Virginia has no examination required by law, but it is the practice of the Department of Mines of West Virginia to demand an examination of all mine foremen. And this has received the hearty support of most of the coal operators in that state. When Mr. Paul, who read the last excellent paper, was the chief of the Department of Mines in West Virginia, I believe he demanded an examination wherever he could force it upon the operator. But the practice is now quite general throughout the state although not the law. The same is true of Ohio—the law does not require the examination of mine foremen. In Indiana the examination of the mine foremen is in the hands of the mine inspector, as required by law. I believe here in Kentucky the examination is in the hands of your excellent chief, Professor Norwood.

Character and Purpose of Mining Examinations

What appeals to me most strongly is the character of these examinations. Examining boards, in the majority of cases, are politically constituted. These boards are largely composed of men the majority of whom do not fully understand the questions they ask, and their vote to pass or not to pass a candidate's paper is based on their limited knowledge of the candidate's written answer. I have frequently criticized questions asked by state examining boards. Some of the questions put to candidates in examination could not possibly be answered, and yet the candidate is expected to give an answer. We are frequently confronted with a question that is absurd.

When you think of it, the purpose of an examination is not only to find out what a candidate knows, but what he doesn't know. In this matter we are up against the question of the ability of the examiner to pass on the questions asked intelligently himself. Many a time I have had the answers given in their examination papers sent to me by candidates who had been through the examination, but had failed to pass. They asked me to kindly look over the paper and pass on the questions. I never like to do that, but in some cases have done so. In one instance in one of the Western states, I was called by the governor and asked to go into the matter of the board's markings with him. I think he was thoroughly interested in the complaint of a candidate and wanted to know wherein the paper was incorrectly marked. I did so and went through the paper with him. It took a little time, but it was very interesting work, as he was wholly satisfied that an injustice had been done candidates in the method of marking adopted by the board.

The fact that a candidate does not pass an examining board does not in any wise prove that he is not well informed on the theory of mining. My experience in connection with examining boards, private instruction and correspondence work has been perhaps as varied and as long as most men engaged in coal mining, since for the past 30 years I have been much interested in this subject. I regret to say that in 1885 and 1886, when Secretary of the Iowa Examining Board, we passed some men that I could not conscientiously pass now. At one time when Governor Boise, a Democrat, had been inducted into office (the examining board, of course, was largely Republican, holding over from the last administration), we passed certain candidates by the adoption of rules which, though legitimate, were at the same time not fair to all candidates. I say that frankly; and that is the common experience of most examining boards. In nearly every instance they are governed, to a greater or less extent, by politics or political influence.

Appointment of Examining Boards and Requirements

Going back, now, to the question of what ought to be required of examining boards, let me say that they should be men who are technically qualified to pass on the questions they propound. I believe that most thoroughly, gentlemen. Now, in reference to the matter of the appointment of examining boards. As you know, the board frequently is composed of one engineer, two mine operators and two miners. As a rule, the members of the board who are miners know nothing about many of the questions and often the superintendents know little more.

Miners should hold certificates to be eligible to appointment as board members. Superintendents appointed as board members should also hold certificates. Engineers, of course, if they are competent are supposed to be qualified as engineers and to understand the theory of mining and to be qualified to pass on technical questions, but this is not always true. Some self-styled engineers are only practical men. That operators, superintendents or miners, to be eligible as board members, should be qualified from having passed a similar examination themselves, I conclude after giving much time and thought to the subject. I think it should be a requirement that should be read into every mining law in every coal-mining state in this country.

Mr. President, there are many other points that could be discussed further along this line, and I would appreciate it if these gentlemen would follow in such a discussion. I believe that a great many present could discuss these questions in a way that would be valuable to all of us and especially to this Institute, as well as to this state and to the country.

You are justly proud of Kentucky, and in closing I cannot refrain from repeating a little verse that I found in one of your papers as I was coming on the train. It warmed my heart as I read it, and I hope it will make you feel as good as it made me feel.

KENTUCKY

Not the oldest, nor yet the youngest;
Not the richest, nor yet the poorest;
Not the largest, nor yet the least
But, take it all in all—
For men and women,
For flocks and herds,
For happy homes and loving hearts—
The best place outside of heaven
The good Lord ever made.

Successful Use of Refuse Coal

By E. B. McConnell*

SYNOPSIS—Bone coal possessing a large heat content is often rejected from picking and preparation plants in great quantity. The disposal of this refuse is an item of considerable expense at many plants; others are successfully employing it as a boiler fuel through the installation of shaking grates.

The careful sizing or preparation of coal for market is comparatively new so far as bituminous fuel is concerned. It is becoming more popular, however, as time goes on, and most mines now opened embody some kind of prepara- plant.

During the recent depression in the coal business the mines that thoroughly clean their coal have sold their product, while those that do not either operated from one to three days a week or closed down entirely. Purchasers refused to buy coal containing a large percentage of ash.

The type of preparation plant employed and the amount and thoroughness of the preparation vary widely with the kind of coal mined and the number and size of the slate bands, partings and bone present in the coal measure worked.

However advantageous it may be to the consumer to be able to secure "clean" coal free from bone and slate the question of the economic disposal of these impurities is one ever present with the operator, and the manner in which the problem is solved sometimes has no small bearing on the cost sheet.

In many instances the refuse from the picking table contains as high as 40 per cent. or more of fixed carbon and from 25 to 30 per cent. of ash. This is not of course pure bone or slate, but is composed for the most part of thin pieces of bone, slate or rock to which the coal adheres tenaciously upon either side. No means of freeing this bone from the adhering coal has yet been devised which can rightly be termed a commercial proposition. While it is true that separation may be accomplished by hand work, its cost is disproportionate to the results obtained.

In the Thacker and Kenova fields in West Virginia and Kentucky there are partings from 2 in. to 6 or 8 in. thick of alternate layers and from 1/8 to 3/8 in. thick of low-grade slaty bone and the best quality of coal. This is known as laminated bone. These thin layers cannot of course be separated, and recently purchasers have insisted that this material be entirely rejected.

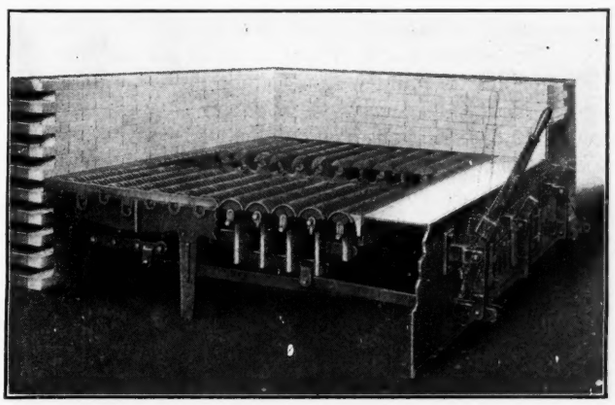
Refuse with 40 per cent. of fixed carbon and, say, 30 per cent. ash has a definite fuel value; but this is difficult to secure through the medium of ordinary hand-fired, stationary-grate boiler furnaces because the ash content is so high that this inert material soon accumulates in such quantity as to choke the fire and render frequent and almost incessant cleaning necessary.

Some Stokers Are Successful Bone Burners

Some types of automatic stokers are so built as to be fairly successful with high-ash fuels. Preëminent among these are chain-grate stokers, which dump the ashes over the back of the grate continuously, also those varieties which are provided with a dumping plate at the rear of the furnace by means of which the ashes are precipitated into the ashpit at frequent intervals.

The high cost of these stokers practically prohibits their use in the small coal-mine power plant, where there can be no saving in labor to counterbalance the interest on the investment, and therefore few coal-mine plants are equipped with automatic stokers of these types.

In the ordinary hand-fired plant the great problem in burning high-ash fuel is to keep the ashes from accumulating on the grates and shutting off the air-supply. This difficulty may be overcome by the use of shaking grates, such as the Ajax manufactured by the Valley Iron Works,



Constructional Details of the Ajax Grate

Williamsport, Penn., by means of which the ashes may be frequently shaken through into the ashpit.

Many mines have successfully solved the problem of refuse-coal disposal by means of these grates. For more than four years the power plant of the Derry No. 1 mine of the Latrobe-Connellsville Coal & Coke Co., at Latrobe, Penn., has used as fuel nothing but refuse from Bradford breakers containing from 45 to 50 per cent. of fixed carbon and from 25 to 30 per cent. of ash. The mines of the Cascade Coal & Coke Co,. at Tyler and Sykesville, Penn., for more than three years have burned breaker and washer refuse containing about the same proportions of carbon and ash as the fuel just mentioned.

The power plant of the McCandlish mine of the Hutchinson Coal Co., at Meadowbrook, W. Va., for more than a year has used as fuel nothing but bone coal, consisting of a slaty parting with good coal adhering to both sides. C. J. Ryan, general superintendent, reports a saving of $200 per month in fuel cost at this mine.

Bone coal is also burned at the Hutchinson mine at Mt. Clare, W. Va. The Grey Eagle Coal Co., Kermit, W. Va., is burning all the laminated bone it produces, which is about one-half of all the fuel used. The fires have never been cleaned through the fire-door, but all the ashes have been shaken through the grates and taken out of the ashpit. The McAlpin Coal Co., McAlpin, W. Va., the New River Collieries Co., at Eccles, W. Va., and numerous other mining firms burn all the refuse rejected

*207 Fulton Building, Pittsburgh, Penn.

from the mine output in the cleaning and preparation processes.

It is a grave question whether many mines that now purchase current from a central-power station could not produce it more cheaply by burning the refuse bone coal now thrown away. They might also afford to clean and pick the output more thoroughly and thus secure a cleaner product if an economic use could be made of the "pickings."

Miners' Homes

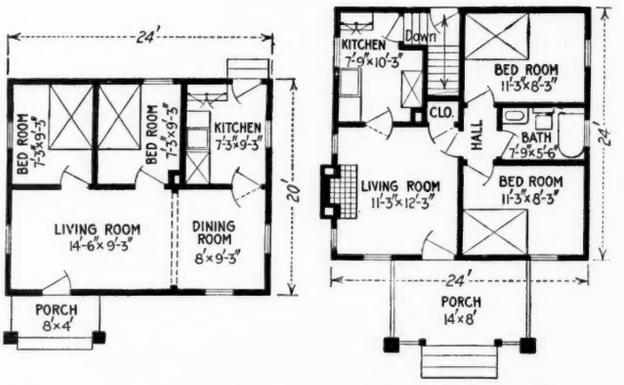
Building houses is a specialty just as much as any other work. No engineer of mines wastes his time designing a pedestal block for an engine or planning a steam hammer. He may prepare rough specifications, but he leaves the details to the manufacturer, and in most cases a specification is merely a trap for the coal company which involves it in difficulty rather than saves it from losses; for the mining engineer is not a machine designer, nor is he a builder and architect.

It is far better to get a house supplied by a concern which troubles its mind with no other problems and can afford to make the necessary variety of residences because it makes 20 or more houses every day. There is no reason why a company cannot be relied on to supply a suitable house from its own plans and specifications just as we can feel assured that we will receive a satisfactory engine from a reputable engine-building firm.

A concern which ships a knock-down house direct to the purchaser saves in freight because it only ships useful lumber and not waste material, and it also saves in material, because it can scheme to reduce waste in cutting. Seeing that the cutting is done by special machinery instead of hand tools the cost of framing is divided by three. The time in which the house is erected is also considerably reduced. The design is also almost sure to be superior to the work of a country architect and certainly better than a mining engineer is likely to evolve, for he does not keep himself posted by reading architectural literature.

Such houses can be put up without skilled labor because no framing has to be done, and with full directions sent by the firm supplying the lumber, men with little natural ability and no experience can do the work of erection.

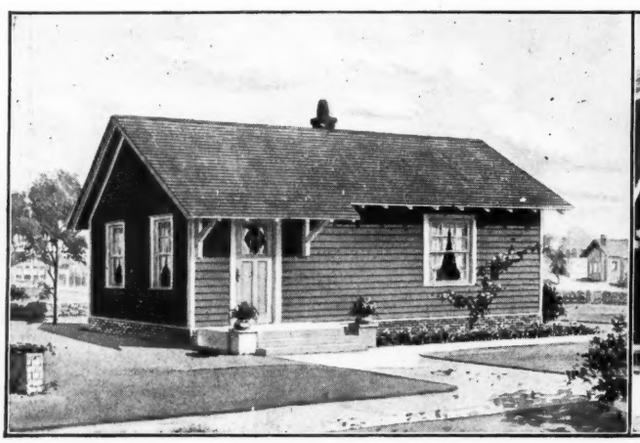
By means of these economies the International Mill & Timber Co., of Bay City, Mich., states it can supply a five-room house with porch and back steps complete from foundation to gable, with all paint and plaster at $390. Two houses are shown in this article which roughly represent the 50 different models which it has on the market. The prices range up to $2213 for a 10-room house.



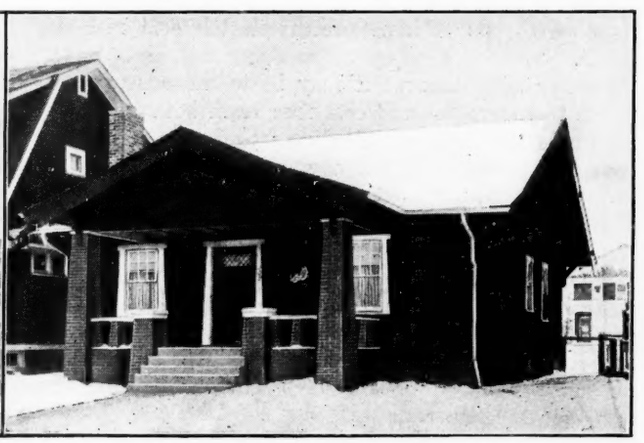
PLANS OF THE TWO RESIDENCES ILLUSTRATED BELOW

Operators who are encouraging their miners to build could well urge their men to buy houses from this or a similar firm, for they could erect them in their spare time and save the profits to architects, carpenters, retailers, wholesalers and middlemen and furthermore eliminate some rehandling and reshipment of material which occurs when lumber is bought from a retailer. The company is as ready to supply a single house as a hundred and will agree not to sell a similar house to anyone in the same vicinity. In the summer months when the coal trade is dull thrifty employees would have a splendid opportunity to erect their homes with but a little help for bricklaying and for plastering if plaster-board is not used.

If the operator is contemplating starting a band in his mining village, he will not consider securing a tailor to furnish the uniforms, but he will write to a uniform-furnishing house. Similarly, if he does not own a merchantable forest or a lumber yard, he will do well to buy his houses by mail order as he would buy the band its suits. Since it is not necessary to fit the house to the lines of the tenant, it is really easier to buy a knock-down house than to purchase a clothing outfit.



SIMPLE FIVE-ROOMED HOUSE

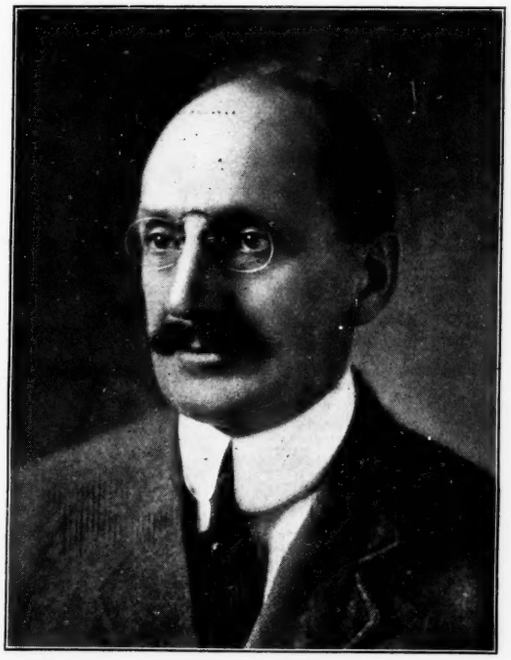


HOUSE WITH STRIKING INDIVIDUALITY

Change in the Bureau of Mines

Herbert M. Wilson, engineer in charge of the Pittsburgh Experiment Station of the United States Bureau of Mines, has resigned from the Government service to become director of a newly formed organization to be known as the Coal Mine Insurance Association.

Mr. Wilson was closely associated with Director Joseph A. Holmes in the inception and development of the Bureau of Mines. Early in 1907, when Secretary James R. Garfield added a technologic branch to the United States Geological Survey, Director Charles D. Walcott of the Survey selected Joseph A. Holmes as chief of the new division and Mr. Wilson was appointed as his principal assistant. With the creation of the Bureau of Mines, Mr. Wilson became engineer in charge of the



H. M. WILSON

Pittsburgh station, a position which he has held ever since.

Mr. Wilson was educated in mining as well as in civil engineering, graduating from the School of Mines, Columbia University, New York. He has spent the last eight years in developing mining experiments, including the use of explosives, experimental investigations in electricity and lighting, and especially in the mine-safety, mine-rescue and first-aid operations of the Federal Bureau of Mines. As evidencing his interest and activity in matters of safety, he is on the advisory council of the Underwriters' Laboratory, Chicago; he is one of the organizers and is on the executive committee of the National Safety council and was the first president and is now the secretary-treasurer of the American Mine Safety Association. He is familiar with the coal-mining industry in every state, having personal knowledge of many of the mines.

The Coal Mine Insurance Association, of which Mr. Wilson is to be the director, is a combination of ten American and British insurance companies that have associated themselves for the joint underwriting of coal-mine accident insurance.

An extended review of Mr. Wilson's life was published in COAL AGE, Jan. 31, 1914, Vol. V, pp. 204 and 205.

The Labor Situation

Owing to the improvement in business many plants are resuming operations in eastern Ohio, where the 13-month strike was recently settled. About one-third of the miners in the district are now employed, but they are probably not working full time. However, the work of preparing other mines for operation is being rushed, and before long most of the plants in the district will be working.

The officers of district No. 5, which comprises the eastern Ohio field, are endeavoring to sell or lease several thousand tents bought to house the miners against whom eviction notices were issued last winter. The men were never evicted and the tents were not used. The money received from the sales is being expended in "strike" benefits for those still unemployed.

The men at the Wheeling Creek mine of the Lorain Coal & Dock Co. have refused to work on the basis of an allowance of 33⅓ per cent. for the slack which passes through the screen and is accordingly not weighed. There will probably be no more work until the tipple is remodeled, so that all the coal mined can be weighed and paid for at the run-of-mine rate. Some other mines are working on this basis, and some have already made arrangements to weigh the coal in bulk.

The actual slack content in eastern Ohio is 36 per cent. But the miners insisted they were making an equivalent contract when they replaced a rate of 69.5c. per ton for screened coal by 47c. per ton for run-of-mine. This would have been a fair equivalent had the slack content been 32.37 per cent.

Some operators have endeavored to arrange temporarily for a percentage somewhat more liberal to the miner—namely, 33⅓ per cent. As a matter of fact the miner knows he has made an advance in the rate per ton in return for other concessions, and he cannot see why the operator, whom he has been contradicting, should now proceed on the basis that the miners' contention was correct. The miner refuses to be "hoist with his own petard," forgetting that he has for months asserted that his petard was a harmless firecracker.

Coming Meetings

Illinois and Wisconsin Retail Coal Dealers' Association will hold a convention June 23-24, at the Jefferson Hotel, Peoria, Ill. Secretary, I. L. Runyan, Chicago, Ill.

West Virginia Coal Mining Institute will hold its summer meeting at Wheeling, W. Va., June 15 and 16. Secretary, E. N. Zern, Morgantown, W. Va.

Pennsylvania Retail Coal Merchants' Association will hold its 11th annual convention at Wilmington, Del., June 15, 16 and 17, 1915, with headquarters at the Hotel Du Pont.

M. O. I. Coal Association's annual meeting will be held June 22-25, 1915, at Cedar Point, Ohio. Secretary, B. F. Nigh, Cleveland, Ohio.

American Society of Mechanical Engineers will hold its summer meeting at Buffalo, N. Y., June 22-25, 1915. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

American Institute of Electrical Engineers will hold its annual convention June 29 to July 2, 1915, at Deer Park, Md. Headquarters will be at the Deer Park Hotel. Secretary, F. L. Hutchinson, New York.

American Mine Safety Association will hold the following meets: July 2-3, Big Stone Gap, Va.; July 23-24, Billings, Mont. Secretary, H. M. Wilson, 40th and Butler St., Pittsburgh, Penn.

The Order Kokoal will hold its annual pow-wow at Chicago, Ill., July 13 and 14, 1915.

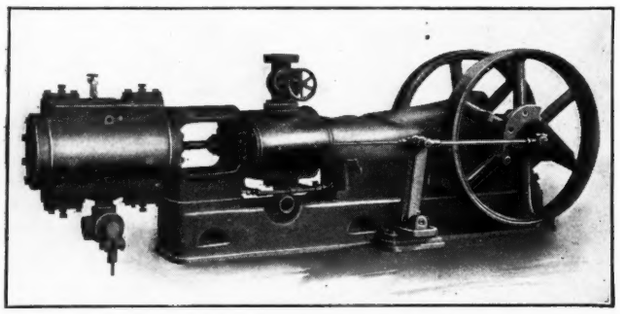
Pennsylvania Retail Coal Merchants' Association will hold its 11th annual convention at Wilmington, Del., June 15, 16 and 17, 1915, with headquarters at the Hotel Du Pont. The first two days of the convention will be devoted to business, including exhibition of coal-handling machinery in action, supplies and motor trucks. The U. S. Bureau of Mines will show by motion pictures every detail of anthracite mining, accompanied by a lecture by Charles Enzian, of Wilkes-Barre, Penn. The "Queen Anne" has been chartered to take the members and their friends on June 17 down Delaware Bay.

New Apparatus and Equipment

Efficient Small Air Compressor

The constant demand for higher efficiency and greater economy, as well as the increasing tendency toward the use of higher steam pressures, has led to the development by the Ingersoll-Rand Co. of the small steam-driven high-speed air compressor shown in the accompanying illustration.

This machine is designed along the same lines as the company's former small steam-driven type, but embodies many improvements which give it a higher efficiency in



SMALL STEAM-DRIVEN AIR COMPRESSOR

air compression and a considerably lower steam consumption. These improvements are:

1. The "Ingersoll-Rogler" air valves, which are now standard on the extensive line of steam, power and electric driven compressors known as the "Ingersoll-Rogler" line. They allow of high speeds, give high compression efficiency, are almost silent in operation and are independent of any operating mechanism. Before adopting the Ingersoll-Rogler valve a thorough test was conducted to determine the life of this type. This test consisted in running a 12-in. stroke compressor 400 r.p.m. over a period of one year, during which time no valves were broken nor any adjustments required. In the two years in which this type of valve has been on the market there has been practically no valve breakage.

2. Balanced-piston steam valves, which type of steam valve was adopted after extensive research. It is designed after the most successful European practice, permits of higher speeds and the use of high-pressure superheated steam, at the same time giving a higher efficiency under ordinary low-pressure steam conditions.

3. Automatic cut-off control, giving the highest possible steam economy under conditions of varying load or fluctuating steam pressures. This control is regulated by a centrifugal flywheel governor which shortens or lengthens the stroke of the piston valve, thus changing the cut-off.

4. Automatic splash lubrication, by means of which all wearing parts are copiously and automatically oiled.

5. Inclosed construction and removable covers, making for cleanliness with great accessibility.

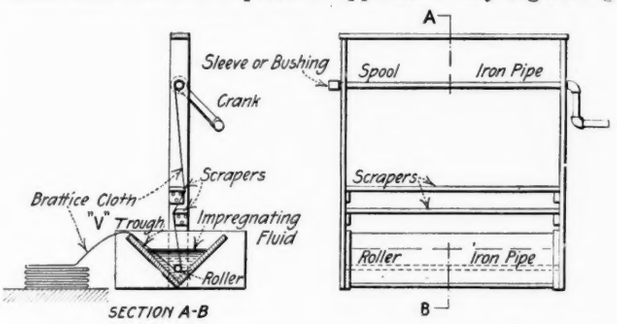
The machine is designed and constructed with great thoroughness in detail. Materials are so disposed as to secure great rigidity without excess weight; bearing surfaces are large and carefully finished. Special provision has been made for ready adjustment of all parts, without loss of time.

The automatic cut-off control is supplemented by an air unloader, assuring great economy at the same time possessing a high degree of automatism, which is essential in a small compressor designed for severe duty and often subject to considerable neglect.

Brattice Cloth Treating Rack

BY DAVIS CROW*

The accompanying sketch shows a rack for treating brattice cloth with tar or other impregnating fluids. This rack has been devised and used by B. B. Hollis at one of the Houston County Coal & Manufacturing Co.'s coal mines and is a useful piece of apparatus. By regulating



SIDE VIEW AND SECTION OF THE RACK FOR TREATING BRATTICE CLOTH

the speed of turning the crank the quantity of fluid taken up by the cloth can be readily governed.

The rack is simple and can be built easily and quickly. All the material required is a few 1-in. boards, strips, pipes and nipples, elbows and sleeves, also a few nails. If tar is used in the trough it flows into the cracks and makes the cloth airtight. The tar must of course be first heated in order to give it sufficient fluidity.

Use of Silica-Graphite Paint

A practice that is fast gaining adoption in progressive power plants is the use of paint for the inner surface of steam boiler drums. This is said to afford protection against pitting. Silica-graphite paint is used for this purpose, and for a number of years the manufacturers of this paint have coated the steam drums of five B. & W. boilers developing 1800 hp., with the result that the drums are in almost perfect condition.

Another instance is a plant equipped with B. & W. boilers developing 8400 hp., where the interiors of the drums were scaled, painted both above and below the water-line and allowed 48 hr. to thoroughly dry. This treatment was repeated every 10 months, and not only

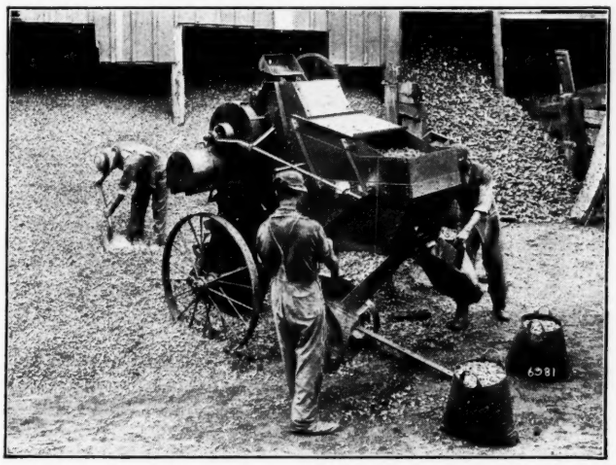
*Engineer, Houston County Coal & Manufacturing Co., Crockett, Tex.

did it stop pitting, but where it had previously taken six men seven days to clean the drums of one boiler, two men now clean them in one day. This latter experience is quoted from a letter of the chief engineer of the New York Life Insurance Co., in the April issue of *Graphite*.

Improved Method of Bagging Coal

Bagging coal which has to be delivered from a coal yard has always been considered as a sort of necessary evil wherever local conditions at the delivery point rendered the chuting of coal directly into cellars an impossibility. Those yards which are blessed with pockets found the bagging problem comparatively easy, as with an abundant supply of coal overhead the drawing off of the material into bags could be accomplished by one man as rapidly as the bags could be disposed of in the wagon. Where coal was carried in ground storage, however, it was more of a problem. The loading of bulk coal has been reduced to a simple matter by the advent of the mechanical wagon loader, which has completely overcome the handicap of ground storage and brought it up to the efficiency of the pocket.

It only remained for a further adaptation of the wagon-loader principles to simplify the bagging problem. By



THE LINK-BELT COAL BAGGER IN OPERATION

using an elevator to keep a bagging bin constantly full of coal, the equivalent of bagging from a pocket has been reached.

The accompanying illustration shows how this has been accomplished. The machine consists in all its essential features of an elevating and screening medium which is identical with that in successful use today on scores of machines loading bulk coal to wagons. The elevator buckets are 16x6½ in. in size and are attached to a double strand of closed joint chain. The screen is of the shaking type, set at such an angle that only by vibrating can the coal be made to flow over it. This slow vibratory motion over the screen insures the coal being thoroughly cleaned.

The motor for operating the loader is of 2 hp., and the transmission is by cut gears throughout. In actual operation with two men bagging from this machine, coal has been bagged at the rate of over 21 long tons per hour, an advance of several hundred per cent. over the tedious method of hand shoveling over yard screens.

The loader is light, and as it is provided with wheels 48 in. in diameter, it is easily moved from one bin to another. The screens are interchangeable for the various sizes of coal from pea to egg, all of which are handled on this machine with equal facility. This loader is made by the Link-Belt Co. of Philadelphia, and embodies the result of many years of experience.

Economical Method of Making Coupling Pins

A Leyner drill sharpener in the shops of a coal mining company was recently fitted with special dies for forging coupling pins for mine cars. This resulted in a considerable economy of the blacksmith's time.

For this purpose a piece of iron stock 1¼ in. in diameter and about 14 in. long is placed in the dies, pro-

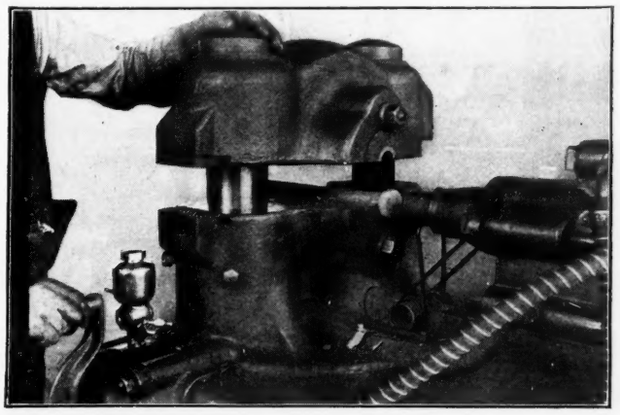


FIG. 1. NEW DIES AND PIN IN THE SHARPENER

jecting about 2 in. The flat-faced hammer or dolly upsets the head, as shown in Fig. 1, bringing down the length of the pin to about 12½ in. The machine operates with compressed air and is controlled entirely by a single lever.

By equipping the sharpener with suitable dies and dolly the pins were turned out at the rate of about two per minute. This rate could have been even greater if it were not that there were only three forges in use and they could not supply the heated stock any faster.

Fig. 2 shows the special dies and dolly used for forging these pins, as well as a blank and a finished pin. It is

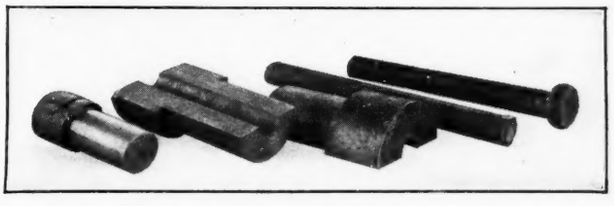


FIG. 2. NEW DOLLY, DIES, BLANK AND FINISHED PIN

planned to make other special dies and dollies so that the machine can be used for miscellaneous blacksmith work, such as welding car couplings. In addition to this special work, the sharpener is used for pointing various styles and sizes of drill steel used for cutting rock and coal in the mine.

Editorials

Have You a Lodge?

Not the drinking kind of course, but a benevolent lodge which teaches the brotherhood of man and gives play to the better instincts. There should be no favorites. Masons, Knights of Columbus, Odd Fellows and Maccabees all are good. They teach the brotherhood we all should feel and knit up the community life. Sometimes churches are almost impossible and lodges are not. In all cases it is well to have one if you cannot have both.

For anything which teaches a man about his fellow's rights prevents the clash of interest. Even the unions are not wholly given to destructive energy. They do not entirely labor to pull down what others upbuild.

It is pleasing to notice the recent attitude toward coöperation in store management especially among the unions of Illinois and Indiana. The stores may never succeed—though we hope they will—but if they educate the shareholders they will do an acceptable work. It is sincerely to be desired that they will be prosperous, for they will certainly promote thrift. Unfortunately the irregular operation of the mines makes it difficult to conduct such a business without credit, and it is difficult to give credit without a large bank account. Accordingly in bad times the coöperative stores do little or no business and lose the goodwill of their patrons.

But successful or not, it is a good sign, for it is constructive work, as is also the generous support recently given to first-aid work in Illinois. If the unions thus begin to show a large sense of their duties of citizenship and cease to criticize benevolence as robbery of their rightful dues they will then be claimants like the lodges to the blessings of mankind.

Powdered Fuel on Railroads

Among the great changes of the future as viewed from the broadest national standpoint will be the use of powdered fuel on railroads if ever that plan is made a success. Everyone should combine to aid this desirable development. In fact, why should not the Bureau of Mines equip a crushing station and, under an arrangement with some railroad, operate a locomotive on a spur of railroad having much heavy traffic, and thus prove what can be done?

The problem interests more than the railroads and is a proper question for national investigation; for when the happy time comes that coal is burned in powdered form the forests will once more be able to grow to maturity freed from the periodical fires formerly started by locomotives. The air along the railroads will be so purified that it will be more possible to have the best of residences facing the track.

Of course the noise of the exhaust would also have to be removed, but even that can easily be done if approached seriously. In fact the railroad engineers, like the mine managers of our forefathers' days, ventilate by exhaust steam, an uneconomical method of creating a draft of air. If the exhaust were used for driving a blower a steady draft would be possible. There are many uses for this steam more acceptable to the general public than that of scattering ashes live and dead over the lawn, porches and weekly wash and over the dead and living leaves of the forest to burn or deaden the trees which are striving to grow.

The mines also will be helped by the use of powdered coal. The loud condemnation of miners for blowing their coal to pieces, instead of mining it, simply because it is unscientific and not in accord with early practice, has always seemed ill-judged. Wherever, and that is in most localities, shooting coal from the solid is under present conditions unsafe it should be unsparingly condemned. Where it prevents coal from entering the market it should be firmly forbidden. But where it is safe and where slack is as desirable as lump coal why condemn the miner to undermine his coal?

The miner is showing that he is not a slave to ancient practices when in the Connellsville region he puts in a blast and shoots the coal from the solid, apparently bringing it down without danger and in such a condition that it is well-suited for coking. Safe methods of shooting even the harder coals from the solid may yet be found as soon as the need for large coal is removed.

We wish to get beyond the time when coal must be mined with such care. We would see it produced cheaply, even though not scientifically, and the use of powdered coal foreshadows the time when coal will be ground out of the hill and handled without the care now devoted to it.

And such coal will be burned with the utmost economy, for perfectly smokeless combustion will result from its comminution. The cost of crushing has always been regarded as a disadvantage, but we believe that the labor cost can be made negligible.

The unfortunate man who now has to be ready to dump coal at irregular moments during the night or day will be made happy by having something to occupy his spare moments—namely, the crushing machinery. He can attend to this work when he is not coaling engines. Of course a more skillful man will have to be chosen, but in the days to come we shall have skillful men everywhere and not in a few selected positions.

Speaking before the International Railway Fuel Association, W. L. Robinson, supervisor of fuel consumption of the Baltimore & Ohio R.R., enumerates 18 advantages in the use of powdered coal, including sustained boiler horsepower; ability to run locomotives for relatively long, continuous mileages or periods; automatic firing; absence of cinders, sparks and smoke; material reduction in cylinder back-pressure through greatly enlarged exhaust passages; saving in inspection, maintenance and operation through the complete elimination of grates, ash pans, dampers, operating gear, smoke-box diaphragms, baffles, netting, spark hopper, hand-hole plate, coal pushers, fire tools, squirt hose and like equipment.

Furthermore he shows that the inclosed fuel container prevents the spilling and loss of coal and keeps it free from snow, rain and other unfavorable conditions; that a more uniform furnace temperature is maintained, reducing the liability of leakage of firebox and flues; and that no special fuel is required for firing up.

He adds that with powdered coal an inferior quality of coal can be used; that the heat losses in combustion are reduced; that fires are not started; that there are no delays for the building, cleaning or dumping of fires at terminals or the cleaning of flues and smokeboxes. Ash-pit tracks and ash-handling facilities at terminals and intermediate stations are unnecessary, superheater units and boiler flues will not be clogged, poisonous gas will not be formed by combustion, there will be no cinders and ash in the ballast to cement it together and burn out the ties, and the work of maintaining the fires in a locomotive in fit condition will take less training and involve less labor.

Obsolescence

It will pay us all to be occasionally reminiscent and to remember how we used to do things around the mine in the close of the past century. Few there are of us who can recall having used electric mine locomotives more than 20 years ago. Most of us will be prepared to assert that wooden rails were not only the standard form of track in the rooms of the mines in which we operated, but also found their way quite freely into the entries. We do not recall seeing kick-back dumps at that early date.

A mine which every one would have thought quite up to date at that time became ten years later entirely behind the times, so rapid was the progress of mining science. Today we are traveling along much faster than we were then, and the prudent mine owner will put his factor for the obsolescence of some of his plant at 10 per cent. per annum. Some equipment of course will hardly live that long, but where it is constantly replaced in some parts and repaired in others it never really wears out. But there does come a time when the old outfit is not worth refurbishment. It will no longer do the work with the new economy demanded.

The little mine car of the last century may still be running and be as efficient or even more efficient than it ever was. Wheels have been replaced; the irons have been renewed; new planks have been supplied. Some trifling changes even have been made in its size—the wheels are larger and more easy-running, the car is better braced, the wheelbase has been increased; but radical improvement involves a larger gage. Such a change demands the transference of the obsolete car to another mine or a bold confronting of the problem of obsolescence and the casting away of valuable later replacements and improvements as well as of those parts which are valueless because it is so long since they have been renewed.

The same is true of the headings, air-courses and shafts. They may be kept in repair and even in some cases improved, but they cannot thereby be saved from obsolescence. In time they become out of date and must be entirely reconstructed or replaced if they are to keep up with modern requirements.

Machinery and boilers in the past wore out almost as fast as they became obsolete. Consequently a generous depreciation allowance was sufficient to make an obsolescent charge unnecessary. But the progress of science is so great that obsolescence will soon be the major item in the cost of amortization, and it will have to be figured not only on constructive details such as headings, shafts, bins, railroad tracks, coke ovens and houses, but on machine units.

The biggest burden of the future will be the burden of reconstruction, but it will be cheerfully borne because of the marvelous economies accompanying it. The progress in mining in the 100 years of the last century was not as important as in the last 20, and it is likely that within 10 years the speed of development will be so great that we shall compress into half a decade the former progress of a century.

In 1895 the mine manager studied mine gases, rope haulage and geology. Today these are relatively negligible studies to a man who has an electric plant, a machine shop, a foundry, coal-cutting machines, a steam shovel and even a sanitation plant on his hands. If he cannot handle these it will avail him little to be an expert on the others.

The man who studies the lore of 1895 is as obsolete as his studies. He must keep up with the progress of the times and constantly remodel his mind, and unless he does he will find that a new man, built like the new mine car on an entirely new model, is the man of the hour.

Western Coal-Selling Plans

The Indiana coal operators have formed a coöperative selling plan, and concerns whose output aggregates 80 per cent. of the coal tonnage of the state have agreed to market their product through a common selling agency. It is understood that Morton L. Gould, president of the Gould Coal Washing & Mining Co., of Indianapolis, will be the executive head of the association.

Mr. Gould has had many years' experience in the production and sale of Indiana coals. He is one of the most prominent and best-known men in the coal trade of Indiana, and his appointment gives assurance that the plan will be successful. It is now expected that within 60 days the new organization will be in operation, and it is anticipated that its headquarters will be in Terre Haute, branch offices being opened in Chicago and Indianapolis.

The Franklin County Operators' Association, in charge of Dr. F. C. Honnold, with headquarters in the Fisher Building, Chicago, is progressing satisfactorily and receiving unqualified support from all its members. Despite the unusually dull times that have prevailed recently, prices have been well maintained on the basis agreed upon, and the operators composing the organization feel that much good will result from their concerted efforts later in the season.

The Williamson County operators have recently organized an association on the lines of that of the Franklin County shippers. This will be in charge of J. L. Keiflein, formerly secretary and treasurer of the New Kentucky Coal Co. The headquarters of the association will be in the Fisher Building, Chicago, and activities will commence on June. 1.

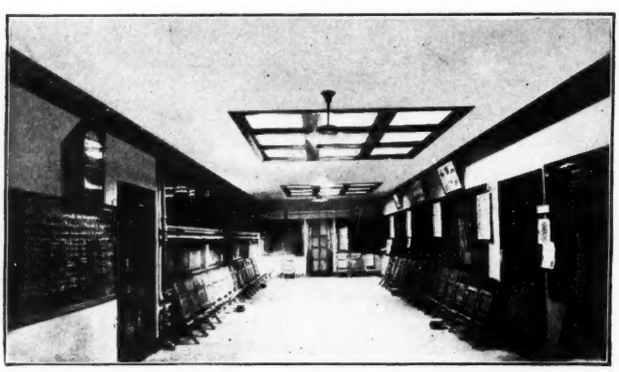
Sociological Department

Rescue-Work in Illinois

SYNOPSIS—The Illinois State rescue corps having given such an excellent account of themselves at Royalton and elsewhere, a description of their training methods is of interest. A well-equipped corps without training or with its apparatus out of order will jeopardize the lives of its members without effecting any good work.

In January, 1910, after the mine fire at Cherry, Ill., where about 300 lives were lost, a special session of the State Legislature was called for the purpose of considering legislation to promote safety about coal mines. At this session, a bill was passed establishing the Illinois Mine-Rescue Station Commission.

Under this act three rescue stations were established to provide prompt and efficient means of fighting mine fires and to save lives and property jeopardized by fires, explosions and other accidents in the coal mines of Illinois.



LECTURE ROOM AT BENTON MINE-RESCUE STATION

These stations were constructed, equipped, and have been continuously maintained at public expense, to serve the northern, the central and the southern coal fields of the state.

The control of these stations is vested in a commission of seven members, appointed by the governor of the state, including two coal-mine operators, one state mine inspector, one representative of the department of mining at the University of Illinois and one representative of the Federal Bureau of Mines. After the organization of the commission, sites for the stations were selected at La Salle, in the northern district, Springfield, in the central district, and Benton, in the southern district; and a superintendent and assistant superintendent were appointed for each station.

At the time of the building of the stations, the commission also acquired three cars—one by purchase from the Pullman company, one donated by the Chicago, Milwaukee & St. Paul Ry., and the third the gift of the Chicago & Northwestern Ry. The last two cars were fully equipped by the railroad companies, the one purchased by the commission being outfitted by that body from its own funds.

These cars were attached to the stations, a suitable barn for their storage being built on the station grounds and a track being run in from the nearest railroad. These cars have lately been taken from the road, and the equipment from them has been used for the establishment of substations at Herrin, Harrisburg and Duquoin. The cars are kept on mine spurs in the towns where the substations are located, so that the equipment can be taken easily to any place from which a call is received.

The equipment at the six stations is as follows:

Breathing apparatus: Fleuss type—Proto, 41; Salvator, 6; Smoke helmet, 3. Draeger type—2-hr., 18; ½-hr., 12. Westfalia type—2-hr 7..

Oxygen pumps: Draeger type, 6; Fleuss type, 3.

Safety lamps: Electric—Hubbell, 44; Draeger, 3; Fleuss, 2. Oil—Hailwood, 12; Wolf, 25; Davy, 6.

Testing apparatus: Fleuss meter, 4; Draeger water gage, 6; Draeger testing bag, 3.

Pulmotors, 6; mine cages, 3;

In addition to this standard apparatus, the teams at each station have been provided with special apparatus as follows:

Two canary birds, 1200 feet of life line with reel, 1 gross of chalk, 7 signal horns, 1 thermometer, 2 hatchets with shields and belts, 1 8-lb. sledge, 1 saw, 7 flash-lights, 2 lb. of nails and rolls of brattice cloth.

Until September, 1914, the work at each station was done by the superintendent and his assistant, relying on such certificated men as could be secured on call. Realizing that they could improve this method of working, the commission ruled that there should be at each station a team of five men, who would take regular training in rescue and first-aid work and who should sign an agreement to respond to all calls received by the station. The value of such a team was proved when the Benton station received a call at the time of the Royalton explosion. On that occasion eight trained men from the station arrived at the mine in less than three hours from the time when the call was received.

When the cars were kept traveling about the state, a minimum of six days of training was required before a certificate and a rescue-corps button were awarded to those who were trained. These six days were so arranged that a man made six trips in the smoke gallery and received 12 lessons in first-aid work. The following test was required of those seeking final certificates as mine-rescue men:

TWO-HOUR TEST

1. Make eight complete trips around the gallery on the ground floor.
2. Make ten trips over the overcast.
3. Carry 25 bricks over the overcast.
4. Crawl through the tunnel three times.
5. Carry four props over the overcast.
6. Saw two props.
7. Set five props and knock them out.
8. Hang a canvas, take it down and fold it up.
9. Pull the weight 60 times.
10. Two men carry a dummy once around the gallery, lifting it over a car.
11. Two men push a car once around the gallery.
12. Make eight complete trips around the gallery on the ground floor.

Severe Training Required of Certificated Men

With the formation of teams at each of the stations, a change was made in the method of training, the number of lessons being increased to 12. For the team training, the following schedules have been arranged:

SCHEDULE NO. 1

1. Walk the entire length of the gallery and back again ten times. (This distance is equivalent to a quarter of a mile.)

2. Erect a temporary stopping under the overcast with brattice cloth, cutting two props and a collar the proper length for supports.

3. Two men build a brick stopping 1½ bricks wide, in front of the temporary stopping, the other three men supply them with bricks carried in gunny sacks, 10 bricks to each sack load.

4. Take down both the stoppings and return them to the point where they were found.

5. Alternately pull weight five times and walk around the gallery twice until the 2-hr. period has expired.

SCHEDULE NO. 2

1. Walk ½ mi. and return across country.

2. Enter the gallery in team formation with life line and other regular equipment and restore ventilation by carrying brattice cloth down the middle of the roadway, using one side of the cloth for the intake and the other for the return, always assuming the gallery to be filled with dangerous afterdamp from an explosion.

3. Crawl through the tunnel three times.

4. Take brattice down and return to the point where it was found.

5. Push mine car around gallery and pull weight until the 2-hr. period has expired.

SCHEDULE NO. 3

1. Carry six props over the overcast and set under a collar.

2. Saw off the ends of three props.

3. Carry ten bricks in gunny sacks around the gallery five times, passing over the overcast, and leave them at the point where they were found.

4. Carry dummy which weighs 150 lb. over the overcast and around the gallery on a stretcher.

5. Substitute a man for the dummy and give artificial respiration by the prone or Sylvester methods.

6. Use a pulmotor on the patient.

7. Alternately pull the weight and walk around the gallery until the 2-hr. period has expired.

SCHEDULE NO. 4

1. Enter gallery in team formation with the life line and other regular equipment, including one ½-hr. apparatus. Each member of the team will assist in carrying this outfit, being relieved by some member of the corps after traveling about 200 ft.

2. Make eight trips around the gallery, passing over the overcast on each trip.

3. Assume that a man in the lecture room is barricaded from afterdamp; apply the ½-hr. apparatus, load him on a stretcher and carry him twice around gallery and to fresh air; unload him and for one minute use artificial respiration, by the prone or Sylvester method.

4. Resume work and build a stopping of rock or brick under the overcast near the farther end of the same.

5. Cut and set up a row of props under the overcast and hang canvas on the props from a point near the stopping to the tunnel. This also may be continued for the length of the tunnel.

6. Take down the stopping, canvas and props, and place where found.

7. In turn make trips around the gallery, pull the weight and crawl through the tunnel, using horn signals during the operation and continue till the 2-hr. period has expired.

SCHEDULE NO. 5

1. Make 10 trips around the gallery as if exploring a mine after an accident, working in team formation by horn signals.

2. In exploring, a fire is found; the captain gives a signal to that effect. Seal off the burning area by a temporary brattice, then by a permanent 12-inch brick wall, the bricks being carried from the extreme end of the gallery on an improvised stretcher. Take down the wall and put the bricks back where they were found. (Not less than 600 bricks shall be used in building the wall.)

3. Form the team in line and examine the gages. Apparatus men Nos. 1, 2 and 3 go through the tunnel, while the others walk once round the gallery, meeting the three men at the end of tunnel. Apparatus men Nos. 4, 5 and 6, now in front of the line, go through the tunnel, while the others go round. Meet as before at the end of the gallery, all the men being in their proper places. Repeat this three times.

4. Carry dummy around gallery and over mine car, changing men each trip as if in relays. Do this four times.

5. Each man saw the ends off two props and pull the weight 25 times.

SCHEDULE NO. 6

Imagine an explosion in the gallery, which, for the purpose, represents a slope mine. The entire mine is filled with dangerous gases. The roof at one end of the overcast is in unsafe condition. All stoppings are blown out. A man is at the far end of the mine from the main entrance near the escapement shaft. The main entrance is that farthest from the overcast. The escapement entrance is full of débris and is inaccessible, and entrance to the mine must be obtained at the main slope, which is the intake. The fan is uninjured. A fire is burning in the mine about halfway inby.

Rescue the man and extinguish the fire, observing as nearly as possible the rules to be observed in case of mine fires and explosions, particularly those relating to work that should be done before entering the mine, the establishment of an inside base, the handling of supplies to that base, the relief of rescue teams at regular intervals and the keeping of accurate records of every event.

The horn signals to which reference is made in these schedules are those used by the Federal Bureau of Mines, given in "Miners' Circular 15, Rules for Mine-Rescue and First-Aid Field Contests," and are as follows:

Number of Blasts	Command Indicated
1	Crew at rest—start to march, captain in lead; maintain 2-yd. intervals.
1	Crew marching—halt.
2	Turn on oxygen and close apparatus.
3	About face.
3-1	Each member examine and read pressure gage, holding gage for inspection by captain, who will record pressure and time of day.
4	Bring forward stretchers, load injured, and lift stretcher preparatory to removal to fresh air.
3-3	Rescue man in distress; all members go to his relief and assist to fresh air; give first-aid treatment.
2-2	Fire discovered; bring fire extinguishers and attack fire.
2-3	Crew retreat toward fresh air.

The Larger Coal Companies in Illinois All Have Apparatus

Besides the apparatus and stations of the Illinois Mine-Rescue Station Commission, several coal companies in Illinois have equipped mine-rescue stations of their own, some of them being well equipped. The companies owning oxygen breathing apparatus are:

Bell & Zoller Mining Co., Zeigler, 8 sets of Draeger.

Breese-Trenton Coal Co., Breese, 3 sets of Fleuss.

Chicago & Carterville Coal Co., Herrin, 1 set of Fleuss.

Chicago, Wilmington & Franklin Coal Co., 3 sets of Fleuss.

Johnston City Coal Co., Johnston City, 2 sets of Draeger, 1 pulmotor.

Madison Coal Corporation, 18 sets of Fleuss, 6 Salvators.

Mt. Olive & Staunton Coal Co., 3 sets of Draeger self-rescuers.

O'Gara Coal Co., Harrisburg, 2 sets of Draeger, 1 pulmotor.

Saline County Coal Co., Harrisburg, 2 sets of Draeger, 1 pulmotor.

Spring Valley Coal Co., Spring Valley, 4 sets of Fleuss, 5 sets of Westfalia, 1 pulmotor.

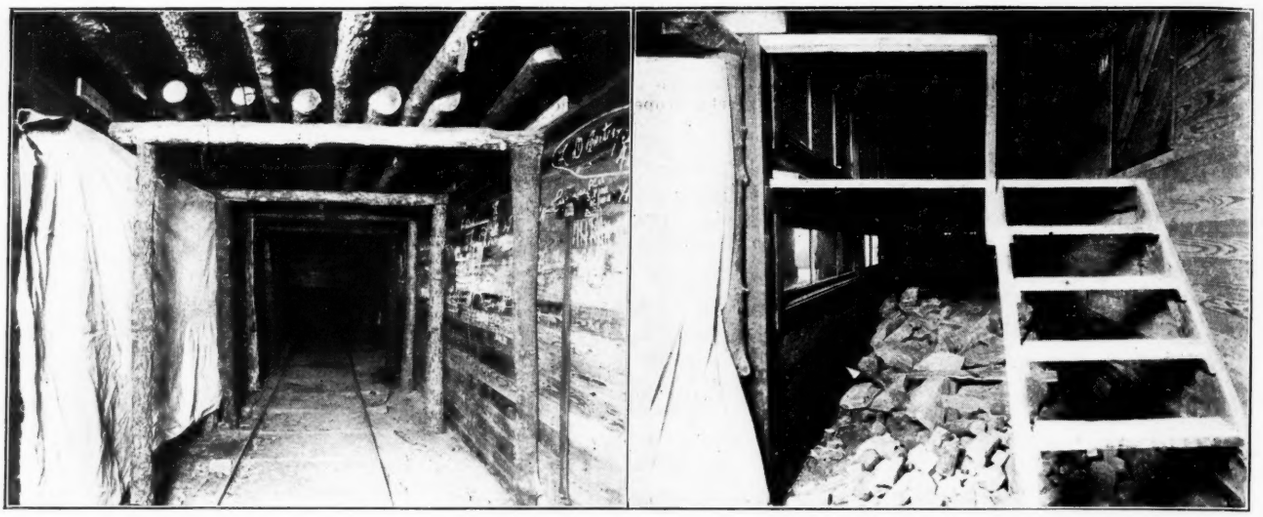
Superior Coal Co., Gillespie, 4 sets of Fleuss, 2 sets of Draeger, 1 pulmotor, 6 sets of Draeger self-rescuers.

That there is need for the number of rescue apparatus that there is in Illinois is well set forth by the calls to which men from the different stations responded in 1913-14, as follows:

Mar. 31, 1913, Southern Coal & Mining Co., Oak Hill mine, Belleville. Opened up fire that had been sealed off.

Apr. 9, 1913, Southern Illinois Coal Co., Freeman mine, Herrin. Fire extinguished.

May 24, 1913, Carterville District Coal Co., Marion. Fire controlled. One shotfirer saved, one dead.



LONG SIDE OF TRAINING GALLEY — IMAGINARY OVERCAST AND ROCK FALL

VIEWS OF BENTON MINE-RESCUE STATION

June 13, 1913, Dering Coal Co., No. 11 mine, West Frankfort. Opened up fire area that had been sealed off.

June 17, 1913, Lovington Coal Co., Lovington. Opened up fire area that had been sealed off.

Nov. 8, 1913, St. Louis-Coulterville Coal Co., Coulterville. Fire extinguished.

Nov. 14, 1913, Franklin Coal & Coke Co., Royalton. Fire controlled.

Nov. 30, 1913, Franklin Coal & Coke Co., Royalton. Opened up fire area that had been sealed up.

Dec. 14, 1913, Franklin Coal & Coke Co., Royalton. Opened up fire area that had been sealed up.

Feb. 21, 1914, Lake Creek Coal Co., Johnston City. Explosion; two men killed.

June 29, 1914, Lake Creek Coal Co., Johnston City. Fire controlled.

July 21, 1914, Lake Creek Coal Co., Johnston City. Opened up fire area that had been sealed off.

July 24, 1914, Zeigler Coal Co., Zeigler. Fire in escapement shaft; one man killed. Fire extinguished.

Aug. 6, 1914, United Coal Mining Co., Christopher. Fire controlled after 24-hr. work.

Aug. 22, 1914, Dering Coal Co., Mine No. 11, West Frankfort. Explosion; two men and one mule killed. Rescue apparatus of great service in recovering bodies.

Sept. 1, 1914, Joseph Kuskowski, La Salle. Overcome with gas. Revived after 40 min. with pulmotor.

Sept. 2, 1914, Big Muddy Coal & Iron Co., Mine No. 7, Herrin. Fire sealed off.

Oct. 27, 1914, Franklin Coal & Coke Co., Royalton. Mine explosion; 52 men killed. Mine completely explored within 24 hr. and one man rescued.

Dec. 27-29, 1914, Saline County Coal Co., Grayson mine, Eldorado. Mine recovered. Both shafts had been sealed at the surface on account of an underground fire. Men succeeded in confining the fire to the face of two entries by erecting stoppings therein. The fire was over 2500 ft. from the shaft bottom, and breathing apparatus had to be worn from the surface, as the shaft bottom was so arranged that it was impractical to establish a base of operations at that point.

The following men are in charge of the different stations and substations: La Salle station, Alexander Jones and William McMillan; Springfield station, Thomas English and George Smith; Benton station, James Towal and M. J. Carraher; Duquoin substation, Charles Swan and William Cummings; Harrisburg substation, Walter Scott and Walter Nichols; Herrin substation, Thomas Rodgers and James Weir. The members of the commission are Thomas H. Devlin, Assumption, chairman; H. H. Stoek, Urbana, secretary; Fernand Bernard, Westville, assistant secretary; John Slattery, Toluca; Thomas Jeremiah, Willisville; George H. Deemy, Peoria; Joseph A. Holmes, Washington, D. C.

For the guidance of rescue men when they are called upon, the commission has issued the following rules, to be observed in case of fires and explosions:

DUTIES OF RESCUE-STATION SUPERINTENDENT

1. Communicate directly with a responsible officer of the coal company in order to find out the exact nature and extent of the disaster.

2. Notify the Springfield office by telephone or telegraph.

3. Send for emergency men.

4. Arrange for transportation. (a) With railroads, if the car is to go by scheduled train or by special engine. (b) With owners of automobiles or other vehicles, if better time can be made than by rail.

5. Start as soon as possible; read the mine map en route.

6. Upon arrival, confer with the state inspector of mines and the mine officials to learn additional details of the disaster and to decide upon methods of action.

7. Organize rescue squads, which shall consist of not less than 5 men each and which shall advance in the following order: (a) Breathing apparatus or advance squad. (b) Relief squad. (c) Stretcher squad. (d) Temporary ventilation squad. (e) Material squad. (f) More permanent ventilation squad.

8. Establish an "inside station" at a suitable point in the mine to serve as a base of operations for the advance work.

9. Appoint a competent man in charge of the inside station. He should re-examine all safety lamps before they are taken into the interior of the mine; and he should keep records of the details of the rescue work so that complete data may be obtained for studying the efficiency of the men and of the various breathing apparatus.

10. If possible, provide a telephone at the inside station to communicate with the surface, and to be extended into the workings.

11. Allow no person to go in advance of the ventilating current except the breathing-apparatus squad.

12. Maintain a patrol of all doors and brattices leading up to the inside station.

13. Maintain strict discipline at all times.

DUTIES OF THE RESCUE-STATION ASSISTANT

1. Assume entire responsibility for the condition of the breathing apparatus and rescue equipment, both before and during rescue operations.

2. In packing the equipment at the station, check off each item from a previously prepared list, thus guarding against the omission of anything.

3. Test the breathing apparatus as follows: (a) See that each apparatus has a full charge of oxygen and contains a fresh, unused charge of regenerating chemical. (b) The pressure gage should read 120 atmospheres for the Westfalia, Fleuss and 1907-type of Draeger and 150 atmospheres for the 1910 Draeger. (c) If using an injector type of apparatus, connect the water gage to the inhalation and exhalation tubes and ascertain the pressure and vacuum. This should be 3.15 to 3.94 inches (8 to 10 cm.). (d) See that the circulating system, helmet, face-mask or mouthpiece are airtight. (e) Con-

nect the inhalation tube to a measuring bag or gas meter, and ascertain the quantity of air circulating per minute. This should be 1.77 cu.ft. (50 liters). (f) See that all unions are tight. (g) Place the apparatus on a man. (h) Turn on the oxygen. (i) Test the relief valve to be sure it works properly. (j) In some small building, burn sulphur, hay, rags or other pungent material and have each person test his apparatus for possible leaks before entering the mine.

4. After a breathing apparatus has been worn, examine it carefully before permitting anyone to use it again.

5. To guard against the possible use of an untested apparatus, place on each apparatus that you have examined and found in perfect condition, a white tag with the words "examined; ready for use. In case an apparatus is damaged, and cannot at once be repaired, place thereon a red tag with the words "defective; dangerous to use."

6. Always have a pulmotor at the inside station.

7. Arrange a system for relaying oxygen, potash or soda, etc., from the base of supplies on the surface to the inside station.

DUTIES OF THE SPRINGFIELD OFFICE

1. Notify the manager of all the details of the disaster.

2. Instruct the men in charge of the rescue cars to be in readiness for a call.

3. Render promptly any assistance requested by the rescue-station superintendent.

DUTIES OF THE ADVANCE SQUAD

1. Follow the direction of the leader, who is in full charge.

2. Keep close together; do not separate under any condition.

3. Before starting the work, sit down for 5 min. with the apparatus on and in operation. Advance two or three hundred feet and make another stop of at least 3 min. By this means, all in the party will have regained their composure.

4. If one of the party is overcome or injured, the entire squad must immediately conduct him to fresh air.

5. Each member of the squad should hold a rope which leads to fresh air, in order to prevent them from being lost.

6. Mark the location of the dead and living with chalk on the roof and rib, and number the bodies in the order in which they are found.

7. Chalk your way in and out of the mine.

8. Advance to the face of an entry; do not leave any part unexplored.

9. Have a relief squad at the inside station in readiness to assist at a moment's notice.

10. The relief squad should have the apparatus on and ready for instant service. They can leave the mouthpieces open, or the nose clips off; but these should be ready for instant adjustment.

11. Make careful examination for gas, indications of fire, and other dangers.

12. Mark as dangerous unexplored as well as dangerous workings.

13. Do not work with breathing apparatus in a mine at mosphere hotter than 85 deg. F. wet bulb, unless you are within 100 ft. of good air, and then only for a few minutes at a time.

DUTIES OF THE MINE MANAGEMENT

(These duties may be best accomplished by appointing a competent man to assume entire charge of the surface operations.)

1. Maintain strict discipline on the surface.

2. Cut out all electrical currents which enter the mine.

3. Guard all entrances to the mine by establishing safety lines about each opening.

4. Permit no open lights within these safety lines.

5. Take necessary steps to repair any damages to the ventilating or hoisting equipment, and station a reliable man at the fan to make sure that it is in constant operation.

6. Examine all safety lamps before permitting them to be taken underground.

7. Allow only authorized men to enter the mine.

8. Keep a record of the names and time of the men entering and leaving the workings.

9. Arrange for a sufficient supply of nails, ship-lap lumber, brattice-cloth, saws, hammers, axes, etc.

10. Furnish promptly all supplies needed by the rescue squads in the mine.

11. Organize and hold in readiness repair gangs to enter the mine when called for.

12. Appoint men to take charge of each underground shift (except those wearing breathing apparatus).

13. Prepare a list of the missing miners, and arrange for the care of the survivors.

14. Provide food and shelter for those engaged in rescue work.

15. Have a physician on hand.

16. If possible, have a physician at the inside station with necessary supplies for his use.

GENERAL ADVICE

If there is a possibility of saving life, hasten; but be cautious and prudent. Remember that if the life of one of the rescue party is sacrificed, a bad matter is made worse and the resulting delay may make it impossible to reach the entombed men in time to save them.

Remember also that the state inspector of mines and the county mine inspector are not only men of experience but are vested with state authority to take charge of mining properties in case of disaster. The rescue-station men should, therefore, coöperate heartily with the inspectors in this great work of saving life and property.

The temporary-ventilation squad should not leave gas behind them in side or cross entries, if it can be avoided. Ventilate or brush it out if it is at all possible.

The breathing squads should not begin the first exploration after an explosion by attempting to descend into the mine by means of the escapement stairway. The stairway should always be examined from below and not from above, as there is great danger of the lower portion of the stairway being destroyed by an explosion. A man descending from the top might fall down the stairway on acount of his inability to see the damage that had been done. If he comes to the bottom of the stairway first, he will avoid this.

Do not forget the collapsible cages stored on the rescue cars. If the mine cages are destroyed, or it is necessary to descend by way of the air shaft, these cages may be of great service.

The roof of the mine should be carefully examined by the breathing squad before fires are fought. Water from the hose should never be thrown on the roof if it is possible to avoid doing so. If the roof is of black slate, there is great danger of the water causing the roof to work; for this reason it is safer to timber the roof before starting to fight a fire. A row of props well set is generally sufficient.

Oklahoma First-Aid Meet

By B. E. Clark*

The second annual first-aid contest among the miners of Oklahoma was held at McAlester on Saturday, May 22, under the auspices of the Mine Operators' Association and the United Mine Workers of America. Nine teams from Coalgate, Brewer, Lehigh, Savanna, Dow, Wilburton, School of Mines, Gowen and Krebs participated. There were about 600 spectators. The direction of the meet was under Bureau of Mines officials—Dr. J. J. Rutledge, K. H. Chisholm, J. W. Koster and W. D. Ryan. The men were trained by Messrs. Chisholm, Koster, Young and East, all of the Bureau of Mines.

There were three separate contests—the one-man event, the two-man event and the team event. For the one-man event the first prize was a Koehler safety lamp and a Justrite carbide lamp and first-aid packets. The second prize was a Koehler safety lamp and a Justrite carbide lamp. In the two-man event the first prize was two Wolf safety and two Justrite carbide lamps and first-aid packets. The second prize was three subscriptions to "Coal Age." In the team event the first prize was the silver championship cup, six American Mine Safety Association medals, first-aid packets and a trip to the Kansas City meet provided by the miners' and operators' associations. The second prize was six Justrite lamps and six subscriptions to the "Mine Workers' Journal." The third prize was six Baldwin lamps and six subscriptions to the "Colliery Engineer." The results were:

One-Man Event.—First prize, Krebs, score 100 in five events; second prize, Savanna, score 100 in four events and 92 in last tie, general average 98⅗.

Two-Man Event.—First prize, Krebs, score 100 in two events; second prize, Gowen, score 100 in one event and 94 in tie-off, general average 97.

Team Event.—First prize, Lehigh, score 100 in three events; second prize, Dow, score 97⅘ in three events; third prize, Krebs and School of Mines tied with 97. In breaking the tie Krebs received 100 and School of Mines 90.

*Mine engineer, Dow Coal Co., Savanna, Okla.

State-Wide First-Aid Contest in Illinois

By Oscar Cartlidge*

SYNOPSIS—The labor unions in Fulton County, Illinois, all but one, financed this state-wide contest by giving 5c. per member. The operators gave $10 per mine. One local union was represented by a competing team.

The Fulton County First-Aid Association was organized in January of the present year with a large and enthusiastic membership, which immediately began planning ways and means to promote and encourage the first-aid cause in that district of Illinois.

David Z. Thrush, state mine inspector, Farmington, was elected president; John Woods, miner, St. David, secretary; M. S. Coleman, superintendent Big Creek Coal Co., Canton, vice-president; Samuel McKinley, miner, Norris, treasurer.

Shortly after the organization it was decided to hold a first-aid contest on May 1 which should be open to the entire state, and Oscar Cartlidge, chairman, Springfield; James Taylor, Peoria; M. S. Coleman and William Spenny, Canton, were appointed to arrange a program and select the prizes.

A finance committee was named, and the Canton Commercial Club offered $75, agreeing to settle any deficit that might exist after the contest was over. Mr. Woodruff was also active in assisting to carry out the thousand and one details that arise at an affair of this kind.

DUE TO LIBERALITY OF UNIONS AND OPERATORS

Each local union in the county was requested to assess the membership 5c. per capita, and each mine was asked to give $10. It is worthy of note, as indicating the interest in this work in Fulton County, that every mine paid the amount requested and also every local union but one.

The program recorded below was followed to a successful conclusion, even to starting and finishing on time, which is rather unusual:

At 9:30 a.m., parade of first-aid teams and miners, around City Square, headed by the Joe Hooker Martial Band. 10 a.m., address of welcome, by Mayor R. M. Kingsland, of Canton. 10:30 a.m., response by D. Z. Thrush. At 11 a.m., one-man event. First prize: Gold medal for contestant; bronze medal for subject; $10 cash. Second prize: Silver medal for contestant; bronze medal for subject; $5 cash. Third prize: Silver medal for contestant; bronze medal for subject; $2.50 cash. This event to be followed by dinner.

At 1:30 p.m., team event for five or six men. First prize: American Mine Safety Association medals; a silver loving cup and $50 in cash. Second prize: Gold medal for each member of team and $30 in cash. Third prize: Silver medals for each member of the team and $15 in cash.

Event for teams of boys, 16 years old and under. First prize: Junior gold medal for each member. Second prize: Junior silver medal for each member.

The prizes were awarded in the Princess Theater at the close of the contest. The appointed judges of events were: Judge-in-chief, Dr. J. E. Coleman. Judges: Dr. P. S. Scholes, of Canton; Dr. J. C. Simmons, of Norris: Dr. R. G. Richards, of St. David; Dr. Will Plumer, of Farmington; Dr. D. S. Ray, of Cuba. Five others were afterward added so that each of the entering teams had a judge.

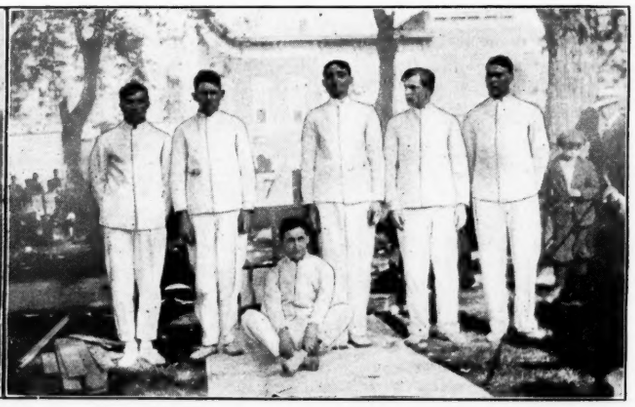
At 6:30 p.m., a lecture by W. D. Ryan of the United States Bureau of Mines, at Princess Theater. 7:30 p.m., free moving picture show in the Princess Theater showing mine-safety methods. Reels loaned by the United States Bureau of Mines.

The following discounts were used, being those recommended by the committee of the American Mine Safety Association, which was appointed to regulate first-aid training and contests:

	Per Cent
1. Not doing the most important thing first	6
2. Failure of captain to command properly	1
3. Slowness in work and lack of attention	2
4. Failure to entirely cover wound or ignorance of location of injury	4
5. Ineffective artificial respiration	11
6. Splints improperly padded or applied	6
7. Tight, loose or improperly applied bandages	5
8. Insecure or "granny" knot	4
9. Unclean first-aid material	3
10. Failure to have on hand sufficient and proper material to complete a dressing	3
11. Lack of neatness	2
12. Awkward handling of patient	4
13. Assistance lent by patient	3
14. Tourniquet improperly applied	7
15. Failure to stop bleeding	8
16. Not treating shock	5
17. Failure to be aseptic	7
18. Incorrect treatment	12
19. Failure to temporarily control hemorrhage until tourniquet is applied	7
	100

Samuel Pascoe, miner, of Farmington, was named officer of the day and was delegated to present all prizes, except the medals of the American Mine Safety Association, which were presented by the writer.

Big Muddy Coal & Iron Co. Team, Which Landed the Second Prize



Natty Team of Bunsen Coal Co., Danville, Which Ran Third

The teams entered were as follows:

1. Local Union No. 860, St. David, Ill.; W. Thomas, captain. 2. Big Creek Coal Co., St. David, Ill.; K. Hogan, captain. 3. Big Muddy Coal & Iron Co., Herrin, Ill.; B. Milam, captain. 4. Cuba team, Cuba, Ill.; J. Cooper, captain. 5. Brewster & Evans Coal Co., Peoria, Ill.; T. Trigg, captain. 6. LaSalle Mine Rescue Station, LaSalle, Ill.; W. Kemery, captain 7. Bunsen Coal Co., Danville, Ill.; J. Krainock, captain. 8. Farmington team, Farmington, Ill.; W. Craine, captain. 9. Gillespie First-Aid Association, Gillespie, Ill.; G. Mauchlin, captain. 10. Gillespie team No. 1, Gillespie, Ill.; J. Struthers, captain. 11. Dewmaine team, Dewmaine, Ill.; E. Russell, captain.

Following are the junior teams: Farmington team, Farmington, Ill.; H. Steel, captain. St. David team, St. David, Ill.; L. Canfield, captain.

Three problems were given in the team event, and the average rating received determined the standing of the team, the judges changing places each time. The problems were handed to the team captains in sealed envelopes and they were allowed 5 min. in which to read them over.

Problem No. 1.—Compound fracture of left thigh with profuse arterial bleeding; compound fracture of right forearm; cut from outer corner of right eye to top of right ear with bleeding. Time 10 min.

*Manager, Illinois Mine-Rescue Stations, 1363 Whittier Ave., Springfield, Ill.

Problem No. 2—Fracture of pelvis, left side. Fracture of sixth, seventh and eighth ribs, right side. Fracture of left elbow. Fracture in right shoulder joint. Deep laceration of calf of leg, right side, with profuse venous hemorrhage. Deep scalp wound with hemorrhage from right outer corner of eye to above right ear. Time 18 min.

SUPERIOR NO. 1 TEAM, WINNERS OF FIRST PRIZE
From left to right, in rear, Oscar Cartlidge, W. D. Ryan and James Boston

Problem No. 3—Powder keg exploded, burning miner severely on face, neck, chest, right arm and both hands. Carry 50 ft. on improvised stretcher and treat. Time 12 min.

The standing of the teams at the conclusion of the event follows:

	Ratings			
Team	Event 1	Event 2	Event 3	Average for Events
1—Union 860	99	84	98	93⅔
2—Big Creek Coal Co.	100	88	100	96
3—Big Muddy Coal Co.	100	100	94	98
4—Cuba	100	92	96	96
5—B. & E. Coal Co.	85	81	97	87⅔
6—La Salle Rescue Sta.	95	91	93	93
7—Bunsen Coal Co.	97	100	94	97⅓
8—Farmington	90	78	96	88
9—Gillespie F.-A. Assoc.	98	82	98	91⅓
10—Gillespie No. 1	98	99	98	98⅓
11—Dewmaine	87	76	95	86

This gave first place to the Superior Coal Co. No. 1, of Gillespie; second place to the Big Muddy Coal & Iron Co., of Herrin; third to the Bunsen Coal Co., of Danville.

The Bunsen and Gillespie teams have competed in many events, and neither team has ever failed to be among the prize winners. The former team is the present champion

BEST TEAM OF JUNIORS, A ST. DAVID ORGANIZATION

of the United States, having won that honor at the Terre Haute meet last year.

Nos. 2 and 4 having tied for the highest score made by a Fulton County team, with 96 each, the captains drew lots to see which should get a Johnston & Johnston first-aid cabinet presented by B. Greenwell, with the result that it went to No. 4, the Cuba team.

Two teams entered the junior event, and the boys did creditable work, attracting fully as much attention as the regular teams. The first prize went to St. David and the second to Farmington.

Forty-two men entered for the single event, the problem being:

One man event: Miner overcome by gas in 3-ft. seam; simple fracture of right arm; remove 20 ft. and treat.

Six tied for the first place and so the following problem was given:

Fracture of left knee cap; severe scalp laceration back of right ear. The result was that James McKenna, Big Creek Coal Co. No. 2, was declared winner of first prize; Robert Weir, Superior Coal Co., Gillespie, second; Charles Miller, Superior Coal Co., Gillespie, third.

The four reels of pictures loaned by the Bureau of Mines were greatly enjoyed by a crowded house, as was the address by W. D. Ryan. He was formerly secretary and treasurer of the Illinois United Mine Workers' organization and hence has a large acquaintance in Fulton County.

W. W. Fleming, a Bureau of Mines first-aid worker, on my invitation, was sent to assist in promoting the contest, and spent about 30 days in the county. Much of the success of the meet, which was pronounced by several competent persons the best ever held in the state, was due to his effort and that of the president, D. Z. Thrush. To them, the miners' and operators' committees, and the Canton Commercial Club too much praise cannot be accorded.

Miners Own Homes and Automobiles

In these days when the high cost of living makes the average tradesman or laborer hustle for a living for himself and family, and real luxuries are not considered, it is interesting to note that in a mining town in the New River field of West Virginia there are several coal miners who own automobiles, and good ones, too, and get as much pleasure out of them as the capitalist in his six-cylinder. The fact that they have been able to buy them is not surprising, for when conditions are normal they can make more money digging coal than could be earned by many college graduates, who could not dream of the luxury of an automobile.

And in this same town are a number of coal miners who own their own homes—men who have worked for good wages where living is not excessively high, and are the proud possessors of comfortable homes for their families.

And a visit to the bank in this same town, where all the residents make their living directly or indirectly from the mines, disclosed the fact that there were at least 400 industrial depositors in the savings department, one Italian miner heading the list with $3000 to his credit, and many others with accounts running into four figures. A number of these men could buy automobiles if they wanted them. On the street a husky colored miner was asked to tell the most he had ever made in one month in the mines, and his reply was $327.82, out of which he paid his helper at the rate of $2.50 a day. The truth of this statement was vouched for by the mine manager.

These facts give weight to the claim that of all classes of workmen the West Virginia coal miner has the best opportunity to earn good wages, and save if he wants to.

Misdealing by Coal Company's Representative—Where bills of lading covering shipments of coal came into the rightful possession of a fuel company, and its representative, claiming to own the coal individually, sold it to plaintiff and procured substituted bills of lading in favor of the latter, appropriating the proceeds to his own use, plaintiff remained liable to the fuel company for the value of the coal, although innocently reliant upon the representative's misstatements, where an examination of the substituted bills of lading would have put plaintiff on inquiry as to the representative's right to deal with the coal as his own, since they showed that the substitution was made at the request of the fuel company. (Colorado Court of Appeals, Rocky Mountain Fuel Co. vs. George N. Sparling Coal Co., 143 Pacific Reporter 815.)

Discussion By Readers

The Miner and Safety

Letter No. 2—Referring to the letter of James T. Reynolds, COAL AGE, May 15, p. 861, permit me to say that I have frequently heard experienced miners make remarks similar to those recited by Mr. Reynolds. I have also heard experienced miners who are sensible in other respects and who ought to have known better, upon their attention being called to the danger of certain things that they are doing, reply, "Oh, I have been doing that for 20 years and never been hurt yet," or make some such foolish remark.

Now, when the mine superintendent or foreman is given such a reply to his well-meaning remonstrances, I believe much good can be accomplished if he will then and there sit down and have a heart-to-heart talk with the man and try to convince him of the folly of his way, and point out to him that, even though he has been indulging in such dangerous practices for a number of years without being hurt, it is within the range of possibility that he may be the very next one to be injured as a result of the risk he takes so willingly.

A foreman will always be able to recall instances where men have been injured and perhaps killed by practices that they had always considered harmless. In remonstrating with miners along this line, it is well for the foreman to mention one or more of these particular cases and strive to drive the lesson home in a way that will be effectual in stopping the practice. The miner should be made to feel that it is more good luck than good management on his part that he has escaped thus far.

I believe much good can also be done, in this respect, by occasionally getting as many of the men as possible together and giving them a talk on safety; or, better still, get somebody else to do the talking. Many large coal companies are doing this and illustrating the talks with lantern slides, which always impress the men more vividly than a simple unaided talk. This can be done very conveniently in connection with "first-aid" meetings.

EDWARD H. COXE.

Knoxville, Tenn.

Longwall in Pittsburgh Seam

Letter No. 10—In reading a recent issue of COAL AGE my attention was drawn particularly to the longwall-retreating plan proposed by John Oldroyd for working the No. 8 seam in Ohio. This proposed plan is described in Letter No. 7, May 15, p. 859.

I am an old coal miner, my first experience in longwall work having been gained at Bagillt, North Wales, in 1867, when I was employed as "drawer" in a mine worked on the longwall-advancing system. Since that time, I have worked in mines in several counties in England and Wales, as well as in several of the states. My mining experience in this country began at Pocahontas, Va., 1885.

This experience has made me familiar with almost every method employed in the mining of coal, and I have taken great interest in studying these different methods closely. I cannot say that I have ever yet seen a mine worked on the longwall-retreating plan that proved successful from an economical standpoint. On the other hand, the longwall-advancing system has many advantages. As mine manager for the Oglesby Coal Co.'s mine at Oglesby, Ill., for over eight years, I had a good opportunity of judging of the practical benefit derived in mining coal on this system.

Since 1900 I have changed the plan of working a mine in Iowa from the room-and-pillar system to the longwall-advancing system, the change proving successful in every respect. More recently, I opened a drift mine on the outcrop in this state, and although I had the longwall-retreating system on the brain at that time, having studied it carefully, I did not venture to adopt it in the development of the mine. I may say that I have long since given up the idea that the retreating plan of longwall can be applied as economically or I might even say as safely as the longwall-advancing system. I shall be glad to hear from anyone who has made a success of that method of mining coal for a period of, say, five years.

I was much pleased with G. R. Waddell's letter No. 6, COAL AGE, Apr. 24, p. 732. His letter has the clink of a true longwall man. I fully agree with Mr. Waddell that the No. 8 seam in Ohio can be worked successfully on the longwall-advancing plan. I would say, however, that an expert longwall boss will be required and a few good longwall miners to start the work successfully.

E. J.

Sparta, Ill.

Rotary Converter vs. Motor-Generator Set

I was much interested in the article by Thomas Robson Hay, entitled "Rotary Transforming Equipment for Coal-Mining Work," COAL AGE, May 22, p. 880, and I desire to offer a few comments bearing on the choice between the rotary converter type of machine and the motor-generator described so fully in the article.

High-tension lines now traverse industrial sections and coal fields and sell their energy for the mechanical operation of mines and factories. The adoption of machinery for utilizing and converting this power into the desired or prescribed voltage for mine service is of the first and greatest importance to the purchaser of electric power.

The article in question is especially favorable and partial to the synchronous motor-generator set. However, the 25-cycle rotary converter has been used for years in general and severe railroad work and has stood the test of time. Rotary converters are used exclusively by the Berwind-White Coal Mining Co. and the Pennsylvania Coal & Coke Co. and very largely by the Consolidated Coal Co. and the H. C. Frick Coal & Coke Co.

These companies maintain underground and surface substations equipped with this type of machinery. It

would therefore seem that Mr. Hay's article apparently places the rotary converter on trial; and for the benefit of those mine operators and officials who are using electric power from high-tension lines, it is up to the manufacturer and the master mechanic to seriously scan and analyze the advantages here claimed for the synchronous motor-generator set.

The rotary converter is not an intricate machine. Practically all the adjustments possible on the motor-generator set are possible on the rotary converter. The strongest difference is that the rotary converter delivers 275 volts flat. The service companies are now prohibiting the installation of induction motors on account of their large current drafts. The mechanic having charge of mine machinery is quite as capable as the mechanic in other industries, and the attendant is usually as desirous of acquiring technical information. The old custom of mine operators buying machinery that will not "rip, wear or tear" and overlooking the points of efficiency and economy is a thing of the past. At any rate the rotary is fast coming into use for mine service and the discussion of the advantages and disadvantages of these types of machines mentioned is abreast of the time.

EDWARD ROBERTS.

South Fork, Penn.

Labor in Mining

Letter No. 2—Referring to the query that appeared on the editorial page of COAL AGE, May 22, p. 896, asking why it is necessary for the coal industry to be always in a strike turmoil, permit me to say that in my opinion there are two general causes for the existence of this condition: 1. The activities of the labor agitator and radical labor leaders. 2. The unfairness of certain employers of labor and the consequent injustice that is often done the miner.

The first of these two causes needs no explanation, and I can offer no suggestion as to the best means to be adopted to rid the coal-mining industry of the evil effects of the work accomplished by these unwelcome parasites. It seems almost a foregone conclusion that the labor agitator and the radical labor leader are necessary adjuncts of coal mining, and those familiar with mining operations are too well acquainted with their methods and work to need further explanations.

In regard to the second cause mentioned, however, there is much room for suggestion and improvement. I refer, here, to the unwise and thoughtless disposition on the part of many employers of labor to treat their employees with manifest unfairness, completely ignoring or giving slight attention to their complaints and frequently compelling them to work under conditions that are unhealthful, dangerous and unnecessarily arduous.

My reference to the unfairness of many employers includes all mine officials in authority, both underground and on the surface, who are prone to treat their employees with little consideration and who frequently try to take advantage of them and keep them in ignorance, many times, of conditions that interest them and concern their welfare. Such employers, on being approached by workmen with a just complaint or grievance, refuse to listen to them at all or perhaps put them off with a promise that they have no intention of fulfilling.

When men are treated like *machines* instead of human beings it creates a spirit of unrest and dissatisfaction that, to the agitator, is half the battle. The trouble from this source can be wholly prevented if employers will deal with their men with absolutely fairness and justice. In that way only can they expect to keep the respect, confidence and loyalty of their employees. Employers must manifest a personal interest in the welfare of both their men and their families, safeguard the men at work, provide comfortable and sanitary houses, garden spots, playgrounds and other amusements, as well as schools, churches, hospitals and first-aid training and educational classes. These things all tend to make better and more contented employees.

Labor is as important to capital as capital is to labor. *Both are entitled to fair treatment and equal consideration.* Neither can prosper without the other. An employer cannot expect his men to be fair, honest and considerate of his interests unless he manifests the same interest and disposition toward them. In times of prosperity, when coal brings high prices, labor should be given a proportionate increase in daily wages or made to share proportionately in the prosperity. This is just as true as the fact more readily accepted that a decrease in wages is necessary during a business depression, when coal brings low prices in the market.

In closing, I may be permitted to refer briefly to a third condition or class of people whose baneful influence in promoting discord among workers often escapes notice because of their position and the trust imposed in them. I refer, here, to the disloyal official who has his eye on the job of someone higher up and who strives by underhand methods to stir up discontent among the men, hoping thereby to discredit the one whose position he covets. The tin-can remedy should be applied in such a case as soon as the party is discovered; in other words, he should be promptly "canned."

EDW. H. COXE.

Knoxville, Tenn.

Letter No. 3—The request is made on the editorial page of COAL AGE, May 22, p. 896, that someone enlighten Mr. Le Baron, who asks, "Why is it necessary for the coal industry to be always in a strike turmoil?"

This is an easy question to answer when one gives it careful consideration. I used to ask myself the same question until later when I discovered its solution. The mining industry is communistic, in the sense that its workers form a community in themselves. Their relation to each other and their mutual dependence are almost as close as is the case with the crew of a ship. They live together as a great family.

The ordinary mining town of today is composed of, say, 200 houses, nearly all being built alike and possessing no distinctive characteristics save the number of the house. The lots are of the same size, the houses of the same color and all rent for the same amount. A host of other details are likewise the same for each family. As a result, they think the same thoughts and act on the same principles. I say this condition is peculiar to mining as the industry is conducted in this country today.

In the ordinary mining camp today there is little if any social life except among neighbors whose household details are the same in every respect. The fashion of the clothes worn by men and women is the same and often

strikingly different from that of the outside world. The family income, with few exceptions, is practically the same and the expenses the same. In fact, every detail of life, school, provisions, medical care, etc., is the same for each family so far as the rank and file of the mining town is concerned.

Now, keeping this idea of the sameness of community life in mind, is it any wonder that it becomes an easy matter to stir up trouble among workers who touch elbows so closely that a grievance of one, however slight, becomes a common grievance, recognized and supported by all. It matters not how small or insignificant the complaint may be if it is only strongly asserted and repeated. The community come to feel and act as one. Its members will work together for a long time in peace, with an undercurrent of good-will, and for the most part an ideal of good work, good pay, good health and enjoyment is plainly manifest. Under these conditions there is a general feeling of satisfaction that pervades the entire place.

Assume, however, that something goes wrong and note the suddenness of the change that follows. Ideals of peace, good work, good pay, good health and enjoyment are exchanged for ideals of distrust, enmity and war. The issue is now one of labor against capital, growing out of an assumed or common belief that capital is against labor. The feeling is, as of old, " 'Our handicraft is in danger'—the means of our support is menaced," and the common thought among the workers is, Labor must win; Capital must yield. In every mining camp or village there is the same community life whether union labor or nonunion labor is employed. The word "scab" has become a social weapon and is hurled with terrible force and effect against one who essays to stand out or separate himself from the community of workers.

To illustrate the strength of this social weapon, suppose a big man came into your office and demanded that you throw off your linen collar and your $1.50 necktie and not wear them again. You wear these items of dress because a hundred other fellows do the same. You picture yourself coming downtown in a collar button without collar or tie, and reply that you will quit your job before you will part with these necessities of dress. They are good things that any self-respecting man will refuse to lay aside because requested to do so by another who hails from a Patagonian tribe and is noted for his hatred of clothes, collars and ties, but adores a dress of untanned cowhide as does every self-respecting Patagonian.

When one considers, therefore, that corporate handling of labor is often productive of trouble when least suspected, unless careful consideration is given to avoid these pitfalls, there need be no marvel that strikes occur as often as they do. The marvel is rather that they are not more frequent and that we live and work together in comparative harmony in most mining districts and produce the coal that warms and energizes the world.

N. D. MONSARRAT.

Columbus, Ohio.

Letter No. 4—The recent reference to this subject in COAL AGE leads me to make a few comments on what I believe is a most serious feature of the labor problem and one that is likely to confront the mining interests in the United States, especially those of West Virginia, when the European war is ended. From its importance to the coal industry, this problem demands attention.

Having spent my boyhood days in the old country, I am familiar with labor conditions there as well as here in the United States. It is obvious to even the casual observer that the main reason foreign labor emigrates to this country is because of the better wages paid for the same work. The majority of these people, however, expect to accumulate enough money from their savings to enable them to return to their old home in a few years and live in what they consider comfort the rest of their days. Many and probably the majority of the foreign laborers employed here in coal mining never learn the English language to speak it fluently, and as a result they do not become acquainted with American ways and customs.

The question for us to consider in this connection is what is likely to take place when the war is over. Will there be an influx or an exodus of labor in this country? In my opinion, the exodus will largely overbalance the influx. It may be argued that taxation in Europe will be very high at the close of the war—so high as to be burdensome; but, even so, it must be allowed that such taxation will be adjusted among different classes of taxpayers, the laborer bearing the smallest part. At the present day, the German government is paying to unskilled laborers wages that are 100 per cent. higher than were paid to the average German laborer four years ago. In Great Britain demands for increased wages are now being made and this will undoubtedly be repeated in other European countries.

As a result of the war, there will be an extraordinary demand for labor, not only to go into the mines, but to rebuild cities, cultivate land and, in fact, work along every line of industry. If the question is asked, How will the money be raised to pay for such work? it is only necessary to recall the rapid rebuilding of San Francisco, following its destruction by earthquake and fire in 1906, and observe how readily the capital was advanced for rehabilitating that devastated area in a miraculously short time. There is little doubt that the same experience will be repeated in Europe at the close of the war. Reconstruction will then take place on a much larger scale; competition will be severe not only in coal mining but in other industries as well.

Under these conditions, strong family ties will draw a large portion of our foreign labor back to their European homes where fathers, mothers, brothers, sisters and children are left alone without support. Such will be the demand for labor that government examinations and requirements will be less rigid in all lines of work and men holding minor positions in this country will be able to secure far better paying positions at home.

In addition to all this, mining is becoming more difficult each year and the foreign miner finds it hard to make his way without being taught at least some English and becoming familiar with the ways of this country. The question presented for solution is how to prevent most effectively such an exodus of foreign labor from this country as may be expected to take place.

On various occasions I have urged that what may be called "Continuation Schools" should be established by the state, offering free instruction, particularly to miners on mining subjects and to foreigners, teaching them to speak and read the English language. Trained teachers capable of giving instruction in scientific and practical subjects could be employed. Or, a system similar to what is known as the "Waiking Schools of Norway" might

be well adopted in this country. The plan is worthy of careful consideration by all interested in the labor problem.

This plan may be briefly described as follows: A man of broad scholarship, great aptness as a teacher and possessing particular fitness to win the sympathy and confidence of the working classes goes to a mining community, secures the largest room in the place and establishes a school for the miners. He remains in this place several weeks, assigning and hearing lessons, designating books that must be read and outlining work for future study. He then passes on to another town where he starts the same work in a similar manner. The teacher is selected and paid by the government, which furnishes the general material required in the school work, including all necessary books and papers for the students, besides providing and heating and lighting the rooms for holding the classes.

This plan could be modified in this country to the extent that the regular teacher, in his judgment, could appoint from among the older and better qualified students one to take charge in his absence, designating the time when he would return to the place. In this manner, one regular teacher could supervise the work in, say 10 or 12 different places, staying about two weeks or more in each place and returning two or three times during the year.

In closing, I thought it would be of interest to present the following figures showing the immigration into this country during the fiscal year of 1914. Out of a total number of 1,218,480 immigrants, there were 226,407 belonging to the laboring class. The distribution of this foreign immigration in several of our leading mining states for the same year was: Pennsylvania, 184,438; Illinois, 105,811; Ohio, 74,615; West Virginia, 12,399.

It is a matter of some significance in this state that Pennsylvania received more than 14 times the number of immigrants that reached West Virginia, and Illinois more than eight times the same number, while Ohio received more than six times that number. These figures seem to indicate that West Virginia is sadly neglecting her labor problem. Had the distribution between these states been in proportion to the output of coal, the figures would practically have been: Pennsylvania, 230,000; West Virginia, 60,000; Illinois, 57,000; Ohio, 30,000.

This is a matter that should receive the attention of all West Virginia coal operators. It is to be hoped that mining men in this state will realize the gravity of the labor problem in this country and especially in our own state and adopt some remedial measures before the question becomes a serious menace to the coal-mining industry.

KARL F. SCHOEW.

Huntington, W. Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Chemical Change, Reaction—Any interchange of atoms between two substances, or a combination of two unlike substances, by which one or more new substances are formed, is a chemical change and the process is called a "chemical reaction."

A Chemical Equation—It is a natural law that no matter is ever lost or destroyed. **Matter is indestructible.** As a result of chemical change both the form and nature of the matter may be altered—a solid may become a liquid or gas, or vice versa; but the weight of the resulting products is the same as that of the original substances that are involved in the reaction.

Since there is **no change** in the weight of matter before and after chemical reaction takes place, it is possible to express the reaction by an equation showing the equality of matter. This is called a **chemical equation.** It is formed by writing in the first member the chemical symbols of all the substances entering or involved in the reaction, connecting these together with a plus (+) sign. Likewise, in the second member of the equation, write the chemical symbols of the several products of the reaction, connecting them together, as before, with a plus (+) sign. Then complete the equation by writing the sign (=) of equality between the two members.

For reasons that will be better understood when discussing molecular volume, when writing a chemical equation each substance should be expressed by its molecular formula. This means that any elementary or simple substance as carbon (C), hydrogen (H), nitrogen (N), etc., should be expressed as a molecule; thus, C_2, H_2, N_2, etc.

Illustration—When carbon (C) is completely burned in a plentiful supply of oxygen (O) there is produced carbon dioxide (CO_2). The reaction is expressed by the equation

$$C_2 + 2O_2 = 2CO_2$$

The expression $2CO_2$ should be interpreted to mean two molecules of CO_2, each comprising one atom of carbon and two atoms of oxygen.

Observe there are the same number of atoms of carbon and the same number of oxygen on each side of the equation. **Not an atom is lost** in the reaction, although these are grouped differently. In this case the solid carbon unites with the oxygen (gas) and carbon dioxide (gas) is produced. Also, the weight of the carbon dioxide is equal to the sum of the weights of the carbon burned and the oxygen consumed. There is **no loss in weight.**

It is important to note that the **atoms** involved in any reaction represent the **weights** of the substances they form, while the **molecules** or molecular formulas of the several substances represent their respective **volumes.** Hence, when each substance is expressed by its molecular formula the chemical equation shows both the **relative weights** of all the substances and the **relative volumes** of the gases.

In the reaction represented by the above equation each atom of the carbon molecule (C_2) takes up two atoms of oxygen to form the molecule of carbon dioxide (CO_2), the valence of carbon being four and that of oxygen two. The reaction in this case is complete, the affinity of the carbon for oxygen being fully satisfied.

The Coal Age Pocket Book

Use of Chemical Equations—As previously stated, when properly written a chemical equation shows both the relative weights and relative gaseous volumes of each respective substance involved in a chemical reaction. The relative weights are indicated by the molecular weights of the substances as shown by the completed equation.

In estimating relative gaseous volumes, **the volume of a gaseous atom is taken as unity** and since, as previously explained, an elementary molecule is assumed to contain two atoms and all gaseous molecules at the same temperature and pressure are of equal size regardless of the number of atoms they contain, it follows that **the relative volume of all gaseous molecules is two.**

Application of the Law of Volumes—The law of molecular volume as just explained finds important application in calculating the volumes of gases that are involved in a chemical reaction. While there is never any change in the weight or amount of matter due to chemical reaction, there frequently results a **change in the volume** of the gases concerned in the reaction.

To illustrate such change of gaseous volume with the chemical equation representing the dissociation of ammonia gas (NH_3) by electrolysis, forming free nitrogen (N) and hydrogen (H) gases, placing below each molecular formula its relative or molecular volume; thus,

$$2NH_3 = N_2 + 3H_2$$

Mol. vol. 2 1 3

It is evident that two molecules of ammonia gas, in dissociation, yield one molecule of nitrogen and three molecules of hydrogen, making four volumes in all. In other words, two volumes become four. The volume of the gases resulting from the breaking up of the molecule of ammonia is double that of the original gas.

There is no chemical change of volume when methane or marsh gas (CH_4) is exploded in a plentiful supply of normal air, and the methane is completely burned, forming only carbon dioxide (CO_2) and water (H_2O). The nitrogen of the air being unchanged it may be omitted in writing the equation expressing this reaction, which is as follows:

$$CH_4 + 2O_2 = CO_2 + 2H_2O$$

Mol. vol. 1 2 1 2

The equation shows that the complete combustion of methane requires twice its volume of oxygen; and there is produced an equal volume of carbon dioxide and two volumes of aqueous vapor.

On the other hand, when carbon monoxide (CO) is burned in air, producing carbon dioxide (CO_2), there results a reduction in volume, as shown by the following equation:

$$2CO + O_2 + 4N_2 = 2CO_2 + 4N_2$$

Mol. Vol. 2 1 4 2 4

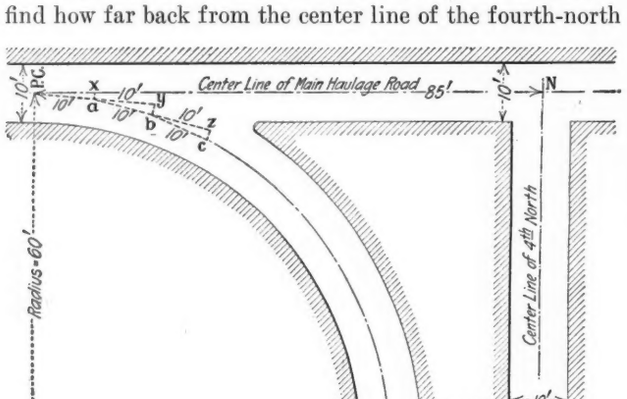
Normal air consists of practically one-fifth oxygen and four-fifths nitrogen. The equation shows that two volumes of carbon monoxide, in burning, consume five volumes of air, and there remain two volumes of carbon dioxide and four volumes of unchanged nitrogen. The seven volumes of the original gas and air are thus reduced to six volumes of burned gases.

Inquiries of General Interest

Laying in a Mine-Track Curve

I have had considerable trouble in laying track curves in our mines so that they will present a uniform curvature and meet the cross-entry at the proper point and tangent to its center line. Suppose, for example, the distance from the second-north to the fourth-north entry is 1200 ft., and I want to cut off the third-north to form a "blind" entry, by a curve extending from a certain point on the main-haulage road outby from the fourth-north and meeting the third-north at a point where the curve will be tangent to the center line of that entry and provide an entry pillar 15 ft. thick. All the entries are 10 ft. wide, which makes the distance, center to center, between the entries 25 ft.

The radius of the curve is to be 60 ft., and I want to find how far back from the center line of the fourth-north



SHOWING CUT-OFF TO BLIND ENTRY

I must start the curve to meet the third-north as described. The north-entries are turned off at right angles to the main-haulage road.

OSTEL BULLOCK.

Cleaton, Ky.

Since the fourth-north entry is turned at right angles to the main-haulage road, the distance from the intersection of the center lines of these entries at *N*, in the accompanying figure, to the point of curve (*P.C.*) is equal to the radius of the curve plus the distance between the center lines of the two north entries, or 60 + 25 = 85 ft.

To lay out the curve, start from the P.C. point and measure a distance of 10 ft. to a point *a* on the curve, making the tangent deflection $ax = 10$ in. This tangent deflection is calculated by the formula

$$ax = \frac{c^2}{2R} = \frac{10^2}{2 \times 60} = \frac{100}{120} = 0.83 \textit{ ft. or } 10 \textit{ in.}$$

The distance *ax* is measured perpendicular to the center line of the main road, while the 10-ft. chord is measured along the curve.

Now measure another chord $ab = 10$ ft. and extend the previous chord, making $ay = 10$ ft. The distance *by* is a chord deflection, and its length is twice that of the tangent deflection *ax*, or 20 in. In the same manner extend the chord *ab*, making $bz = 10$ ft., and measure another chord *bc* of 10 ft., making the second chord deflection *cz* equal to 20 in. Great care is needed in extending each chord in order that the curve shall be tangent to the center line of the third-north at the P.T. point.

Theoretical Velocity Due to Water Gage

Some time since I remember seeing a formula given in COAL AGE for finding the theoretical velocity of air due to a given water gage. The formula was based on 1 in. of water gage as being equivalent to 68 ft. of air column. The formula given was

$$v = 8\sqrt{68\ w.g.}$$

A formula that is much used by fan engineers for obtaining the theoretical water gage (w.g.) due to a given peripheral velocity (v) of the fan, as expressed in feet per second, is

$$w.g. = \frac{v^2 \times 0.078}{32.16 \times 5.2}$$

I would much appreciate an explanation of the difference in these two formulas.

VENTILATING ENGINEER.

Wilkes-Barre, Penn.

The formula first quoted expresses the theoretical velocity (v) of free air, under a water gage ($w.g.$). This velocity is expressed in feet per second and the water gage in inches, as explained in COAL AGE, Vol. 5, p. 219. The formula is developed from the well-known basal formula

$$v^2 = 2gh \text{ or } v = 8\sqrt{h}$$

The second formula, quoted by correspondent as used by fan engineers, expresses more or less closely (depending on the conditions affecting the circulation of the air current) the water gage in inches, due to the peripheral speed of the fan in feet per second. This formula is the result of the experiments of M. Murgue, a French engineer who laid down the rule that "The theoretical depression or water gage due to the speed of the periphery is, in a perfect fan, equal to twice the height of column necessary to generate such velocity in a falling body."*

This rule makes the head, pressure, or water gage due to a given peripheral speed of a centrifugal fan equal to twice the head necessary to generate that velocity in a falling body. The two formulas have a different application and should not be confounded. The difference in their use is similar to the difference between the *stored energy* of a moving body as expressed by $mv^2/2$ and the force of impact as expressed by mv^2, which force of impact is double the stored or kinetic energy.

*D. Murgue's "Theories and Practice of Centrifugal Ventilating Machines," p. v.

Examination Questions

Pennsylvania Anthracite Mine Inspectors' Examination, Held at Wilkes-Barre, Apr. 20-22, 1915

(*Selected Questions*)

Ques.—Briefly explain, in a general way, your knowledge of electricity and its usage in coal mines. What are the usual voltages employed in mines?

Ans.—In respect to its use in coal mining, electricity furnishes a means of transmitting power from a power plant on the surface, where the electric current is generated, to the innermost point of the mine workings, where it is applied for driving coal-cutting machines and drills and frequently employed for the purposes of lighting the mine and blasting the coal. The electric current is conveyed through electrical wire conductors that are installed in the mine passageways. The flow of electricity is similar to that of air or water, the *voltage* corresponding to the pressure, the *strength of current* or amount of current to the quantity of the flow and the *wattage* to the power transmitted.

In the use of the direct current for haulage, coal-cutting, drilling, etc., the common voltages employed in coal mining are 250 and 500 volts. In the use of an alternating current for transmitting power considerable distances, the common voltages employed are 110, 220 and 440 volts. The voltage at the generator is generally 20 or 25 volts higher, in each case, to allow for the necessary drop in transmitting the current from the generator or power plant on the surface to the working face in the mine where the power is to be used.

Ques.—A colliery operated by a slope 2263 ft. long, on a pitch of 45 deg., makes a maximum of 100,000,000 gal. and a minimum of 30,000,000 gal. of water per month; describe the pumping plant required, using simple direct-acting pumps. Assume 80-lb. steam pressure at the pumps and make the necessary calculations.

Ans.—It is necessary to estimate on the maximum flow of water, since otherwise the sump would be overflowed during the wet season. A flow of 100,000,000 gal. of water per month is $100{,}000{,}000 \div (30 \times 24 \times 60) = 2315$ gal. per min. It will be safe, therefore, to base the estimate on a maximum flow of, say, 2400 gal. per min.

The size of column pipe required for this discharge is

$$d_c = 0.25\sqrt{2400} = 12.2, \textit{ say } 12 \textit{ in.}$$

On a pitch of 45 deg., the head corresponding to a distance of 2263 ft. is $2263 \times \sin 45° = 2263 \times 0.707 = 1600$ ft. To this head must be added the friction head due to a flow of 2400 gal. per min. in a 12-in. pipe, say 2300 ft. long. The friction head is

$$h_f = \frac{2300 \times 2400^2}{800 \times 12^5} = 66+ \textit{ ft.}$$

For this size of column pipe the velocity head could be ignored as it is less than 1 ft. The total effective head under which the pump must operate is therefore $1600 + 66 = 1666$ ft., to which must be added a few feet to allow for draining the sump and for discharging at the surface. It will be well, therefore, to estimate on a total effective head of, say 1700 ft.

Using a simple duplex double-acting pump, each cylinder must handle $2400 \div 2 = 1200$ gal. of water per min., and assuming a piston speed of 100 ft. per min. for this pump, the diameter of the water-end is

$$d = 5.37\sqrt{\frac{1200}{100}} = 18.6 \textit{ in.}$$

For a steam pressure of 80 lb. per sq.in., the diameter of the steam-end of a pump required to deliver 1200 gal. of water per min. under a head of 1700 ft. is

$$D = 3.76\sqrt{\frac{1200 \times 1700}{100 \times 80}} = 60 \textit{ in.}$$

Therefore, since we have estimated generously, it will be sufficient to use a simple duplex double-acting pump, 60x18x60 in. The stroke of this pump being 60 in., or 5 ft., the pump will make $100 \div 5 = 20$ strokes per min.

Ques.—A colliery that has been worked down two lifts on a north dip of 62 deg. is full of water. The slope is down 600 ft. From the mouth of the slope north a horizontal distance of 452 ft. a shaft has been sunk, cutting the seam at a depth of 840 ft. How far from the shaft level can the chambers be driven to leave a chain pillar under the slope gangway having a thickness equal to that required by the rule adopted by the mine inspectors and operators, the thickness of the seam being 10 ft.?

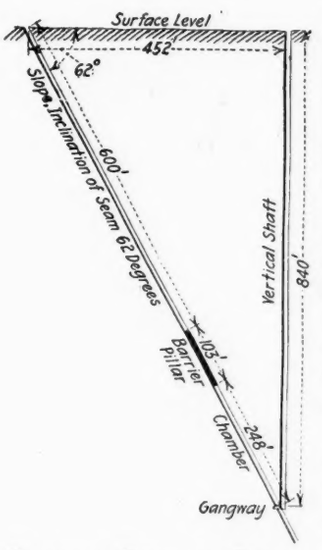


DIAGRAM SHOWING SLOPE AND SHAFT

Ans.—The vertical depth of the foot of the slope is $600 \times \sin 62° = 600 \times 0.883 = 529.8$ ft. The rule adopted for the thickness of barrier pillars in the Pennsylvania anthracite region is: Add 5 ft. to 1 per cent. of the depth below drainage level, and multiply this sum by the thickness of the seam, which gives in this case

$$t = 10\ (529.8 \times 0.01 + 5) = \textit{say } 103 \textit{ ft.}$$

The distance from the mouth of the slope to the bottom of the vertical shaft, as measured on the incline, is $840 \div \sin 62° = 840 \div 0.883 = 951+$ ft. The required length of the chambers is therefore $951 - (600 + 103) = 248$ ft. In providing a safe thickness of barrier pillar in thick steep-pitching seams, as described in this question, an accurate survey is of the greatest importance.

Coal and Coke News

Harrisburg, Penn.

During the week the Governor took up several of the mining bills left for his consideration by the recent Legislature, approving some and vetoing others. The bills approved were the Crow bill providing that bituminous inspectors after having passed two examinations and serving 8 years shall be exempt from further examination, the other bill provides for new inspectors in the anthracite region. One bill vetoed was the McClure bill, providing that where clay mines are worked with bituminous coal mines, they shall come under the jurisdiction of the Department of Mines. The Governor in vetoing this bill said it was "indefinite and defective," as well as unconstitutional.

The approved bill pertaining to the bituminous inspectors is an amendment to Section 4, of Article 19, of the Act of June 9, 1911, and now reads: "The principal examination shall be in writing and each applicant shall undergo an oral examination pertaining to explosive gas, safety lamps, methods of ventilation and mine management. The questions and answers thereto in the oral examination shall be reported verbatim by an expert stenographer and typewritten fully to assist the Board in the work of rating the qualifications of the candidates; provided, that any person who has served as a mine inspector continuously for eight years and has passed two consecutive examinations for the office of mine inspector shall be exempt from taking any further examination and shall continue in said office without any further examination unless removed or suspended as provided by Article 21, of the act of June 9, 1911. Any applicant who shall make a general average of at least 90 per centum shall be deemed successful. . . ." About 17 inspectors will be benefited at once by the new law.

The bill providing for the four new inspectors in the anthracite region now reads, that "the qualified electors of the several inspection districts mentioned in this act shall elect respectively the following number of qualified persons to act as mine inspectors of this commonwealth, namely: First inspection district, 9; second district, 6; third inspection district, 1; fourth district, 4; fifth district, 2; sixth district, 1; seventh district, 1; and the eighth district, 1. Provided that the present mine inspectors in the several districts shall continue in office until the expiration of the terms for which they have been appointed or elected and the number of inspectors to be elected at the coming election shall be reduced by the number of inspectors now regularly appointed or elected and residing and serving in said district. When the terms of the present inspectors shall expire their successors shall be elected in accordance with the provisions of this act until each inspection district shall have its full quota of elected inspectors, under this act. . . ." Luzerne County will get three and Lackawanna County one new inspector.

Judge Ruppel, in deciding the appeal of Archibald Miller, of the Loyalhanna Coal Co., who was fined $100 and costs on a charge of polluting the waters at Dark Shade Creek in Somerset County, declared on June 3 that mine owners could not be held responsible for the pollution of streams by waters from the mines they own or control. In his opinion, Judge Ruppel says the complaint comes from the office of the department of the state created for the protection of the different species of fish. If it had been the purpose of the Legislature to strike a blow at the mining industry of the state, it ought to have declared its intention in unmistakable language. The act cannot be construed to cover more than what is expressly specified and the drainage of coal mines is mentioned in the act."

Some Bills Signed, Others Vetoed

The Dawson bill, including a 2½ per cent. ad valorem state tax on all anthracite coal mined or washed in Pennsylvania and prepared for market, was approved on June 7 by the Governor. One-half of the income is to be retained by the Commonwealth for highway purposes, and the other half goes to the municipalities from which the coal is taken. The Auditor General is charged with the collection of the tax. The act is to take the place of the 1913 act which is now in litigation, and is to be argued July 1 before the Supreme Court. The Auditor General is prepared to enforce the act at once and it is understood the approval is dated June 1.

In all probability steps will be taken in a short time to test the act. The bill contains a provision that it shall not effect the settlements made under the act of 1913.

The Governor also announced on the above date that he had approved the bills designed to bring the coal miners of the state under the workmen's compensation laws, and it is expected that they will be followed in a day or so by the approval of other measures. The bills announced as approved amend sections of the bituminous mine code of 1911 and portions of six acts relating to anthracite mining so as to permit the free selection of mine foremen. It was decided after conferences between legislators in charge and attorneys with the Attorney General that these acts should be signed before the workmen's compensation laws were acted upon. Both bills were settled upon in conference committees.

With the approval of the above bills, the Governor announced vetoes of the Beidleman Bill creating 21 assistant mine inspectors in the anthracite region and increasing the per diem payment of anthracite mine inspectors' examination boards from $6 to $10. This is the second time this session that he has vetoed this bill. On the first bill the Governor says the cost would be fully $100,000 and that the qualifications for the office are inadequate for the responsibility involved. The cost he said is prohibitive and the creating of offices without assurance of increased safety to the coal miners is manifestly unwise.

On the per diem bill the Governor says there is no assurance that the state would get the slightest advantage for the increased expense. He intimated that there was such a confused mass of legislation relating to the whole subject of mine inspectors, that it seemed wise not to add to a situation already unsatisfactory. The Governor thinks that the examination service should be cared for from the state-wide point of view. The method of creating examiners, their functions, their tenure, their powers, their compensation and also the method of appointing mine inspectors should be simplified, improved and unified. Until this is done, he says, it is unwise for the state to add by additional law to a situation wholly illogical and inequitable.

PENNSYLVANIA

Anthracite

Williamstown—An 8-ft. bed of hard Lykens Valley coal has been struck, and will be worked by a company of Scranton and Williamsport capitalists. In this same vicinity a bed of coal was worked about 7 years ago, but on a small scale. So far as can be ascertained, the coal just discovered contains both Nos. 1 and 2 grades of hard coal. A number of bore holes have been sunk on both Peters and Broad Mountains near here within the last 50 years. Coal has been struck at various depths and in different quantities in practically every instance, but the measures were not worked because of the lack of sufficient capital. About 20 years ago coal was struck on the top of Kittatinny Mountain, which was mined on a small scale for some years, then abandoned.

Mahanoy City—White damp overcame five miners at Park No. 1 colliery on June 5 and stretched them like dead along a gangway. Joseph Spikosky, the contractor, spread the alarm and all five were rescued alive. Fumes from heavy blasting in the Park Place strippings broke in upon them, causing the accident.

Hazleton—Men are working night and day turning the old No. 3 Lattimer breaker, now a washery, into a large coal-producing plant again, so as to handle the output from the No. 4 mine, where the breaker was destroyed by a fire at a loss of $100,000 recently. The Pardee Bros. & Co. expects to have the place fully equipped at an early date.

Bituminous

Indiana—A mine mule which served the Glenwood Coal Co. for more than 20 years, when taken out of the mine for a day of rest recently refused to return to work. David E. Williams, of Philadelphia, president of the company, ordered the animal sent to a farm near Philadelphia, where it will pass the remainder of its days in ease.

Elizabeth—The May report of business transacted at Lock No. 3 on the Monongahela River shows that during the month there passed through the lock both up and down 785 steam-

boats, 3082 coalboats, barges, etc., and 20,546,000 bu. of coal. The number of lockages totaled 882.

Uniontown—In ordering into blast within the last week 1009 coke ovens that have been idle for months the H. C. Frick Coke Co.'s plants are now operating to 71 per cent. of capacity. Announcement was made June 5 that 300 ovens were to be fired and on the following day orders were issued to fire an additional 200 ovens. The plants affected are: Brinkerton, Central, Collier, Colonial No. 1; Continental No. 1; Continental No. 2; Lambert, Edenborn, Leckrone, Leisenring No. 1, Leisenring No. 2; Mammoth, Marguerite, Phillips, Redstone, Ronco, Shoaf, Southwest No. 1, Trotter, York Run, Hostetter, Whitney, Buffington, Continental No. 3, Davidson, Dearth, Footedale, Leisenring No. 3, Leith and United.

There are 58 per cent. of the total number of ovens of all companies in the region in blast. Independent producers state that there is no particular activity but that there still continues a consistent demand for their product and they are anicipating an increase in orders within the next two months.

Three experts in coal-land values were appointed by Judge J. Q. Van Swearingen June 5 to appraise the coal holdings of J. V. Thompson. The men named are Julian Kennedy, of Pittsburgh; R. M. Hice, of Fairmont, W. Va., and R. C. Crawford, of McKeesport. A petition asking for the appraisers was presented to the court by counsel for Mr. Thompson's receivers.

Johnstown—Within the last few weeks the Valley Smokeless Coal Co., of Cambria County, has been cutting the timber on the hillsides about its mine openings as a means of preventing landslides. Officials of the company are removing the timber on the assumption that the winds sway the trees and thus loosen the earth and the rest is easy. The cut timber is being used about the mine for one purpose or another. It is also stated that the removal of the timber will not cause the earth to be washed down as the underbrush is sufficiently thick to retain the soil

Connellsville—The coke production of the Connellsville region recently assumed a new high record for the year with a production of 316,000 tons per week. About 8000 tons of this production represented shipments eastward due principally to export business from Baltimore and Philadelphia to South America and New Zealand.

Pittsburgh—Recent heavy rains on the water sheds of the Alleghany and Monongahela Rivers brought the water in the Ohio to a shipping stage, and the Monongahela River Consolidated Coal & Coke Co. started about 1,000,000 bu. of coal for the Southern market. The stage, however, soon receded and shipping was stopped. This was the third rise in less than two weeks during which time the coal companies along the rivers have sent between 11,000,000 and 11,500,000 bu. of coal from the Pittsburgh District, southward.

WEST VIRGINIA

Fayetteville—Kaymoor Mines Nos. 1 and 2 are undergoing repairs. It is said that both mines will resume operation on or about July 1.

State Mine Inspector John I. Absalom recently made a final inspection of the mine at Layland which was the scene of a disastrous explosion last March. It is reported as a result of this inspection that the mine is in better condition than ever before in its history, there having been made many improvements that will eliminate in large measure all possibility of a repetition of the disaster. It is not anticipated that it will be difficult to secure miners to work this operation, as many of the men formerly employed have expressed a preference for this mine.

Thacker—A disastrous fire occurred at the operation of the Thacker Coal & Coke Co. recently, destroying the homes of J. B. Gerald, L. D. Baker, and three or four other houses which were unoccupied but which belonged to the company. The loss entailed will amount to several thousand dollars which was covered largely by insurance. The origin of the fire was unknown.

Morgantown—The Preston County Coke Co. has been firing qute a number of ovens of late, and will shortly begin shipping several cars of coke daily. The plant has been practically idle for several months.

Moundsville—The working force of the Mound City Coal Co. is being daily increased. For some time past the management has been adding a few miners each day to the pay roll. It is stated that this operation has business enough ahead to keep it working to its capacity.

Gary—The United States Coal & Coke Co. recently held its semi-annual first aid contest. Ten teams, nine white and one colored, all composed of employees of the company took part in this contest. Five events were selected by the judges from a list of 20 in which the various teams were judged, all teams operating at the same time. The first prize was awarded to the team from No. 10 Works, while Works Nos. 3 and 11 tied for second place. This company maintains a first-aid and mine-rescue station in which classes are being trained daily.

Wheeling—The West Virginia Coal Mining Institute will hold its annual convention in Wheeling on June 16 and 17. It is proposed to make this an important gathering of the organization. The program as now arranged is such that business and pleasure may be combined, the one not interfering with the other. Many valuable papers will be presented, and an enjoyable time is anticipated.

Fairmont—The holdings of the Consolidated Coal Co. in this vicinity were inspected recently by a large group of Eastern capitalists. The party was particularly interested in the development of the Helen's Run field, where some of the biggest mines in this section are being opened up. The visitors left for the Elkhorn field after inspecting the mines in this section.

ALABAMA

Gadsden—Coal mines throughout the Gadsden district are being worked at full capacity. Extra operations at the mines at Altoona are under way. One heading is being driven there that will require several years to complete.

TENNESSEE

Petros—The Petros Coal Mining Co., of Petros, Tenn., was placed in the hands of a receiver by Judge Will D. Wright of the Chancery Court of Knoxville, Tenn., on June 1. A. H. Wood of Petros, president of the company, was appointed receiver.

KENTUCKY

Wheeler—The Ty Wheeler Coal Co. was placed in the hands of a receiver, June 5. John L. Boyd of the Proctor Coal Co., Knoxville, Tenn., who handled some of the coal, was named receiver. Mr. Boyd is also president and treasurer of the Bear Wallow Coal & Coke Co., and treasurer and general manager of the Prudential Coal Co., both operating in Tennessee.

Whitesburg—Some 200,000 acres of forest land in Letcher, Pike, Knott and Floyd Counties, as well as Dickenson and Wise Counties, Va., already have been pledged to the Eastern Kentucky Forest Fire Association, according to announcement made at the recent meeting here of that organization. J. E. Barton, state forester, presided at the meeting at which the plans of the association to carry out their ideas for protection of the timber were discussed.

A special train recently brought a considerable party of Consolidation Coal Co. officials, with a number of financiers and coal men, to Jenkins and vicinity, to inspect the mines in that district. It is said that the purpose of this visit is to make a number of increases and extensions in this field, and it is expected that considerable holdings in coal land will be developed in the near future. There is considerable activity in the eastern Kentucky coal field, especially in the Elkhorn District.

Hopkinsville—The Terry Coal & Coke Co. announces that contract for intended sale of its mines and property at Mannington, Ky., was made on Mar. 30, last, and the deal is to be closed by a cash payment before Aug. 10, next. The contract protects all stockholders for 20 years so they can buy their coal at the mines on the same terms that obtained with the Terry company. The purchasers have taken care of the property and the stockholders have approved the sale, which is to be at a price sufficient to pay the bondholders in full and effect a settlement with all creditors.

Frankfort—The Court of Appeals has reversed a judgment given by the Ohio County Circuit Court for $15,000 damages against the McHenry Coal Co. to Thomas Taylor, miner. Taylor was injured by falling slate and the jury in reaching its verdict was permitted to consider loss of time, which was not specially pleaded in the suit. Figured up to the time the suit was filed the time lost would have been $116.48 but the Court of Appeals held that there was no way of discovering how the jury may have computed it.

OHIO

Bellaire—The Pultney mine of the George M. Jones Coal Co. recently resumed operation. This mine has been closed since Apr. 1, 1914. Recently, however, a number of necessary repairs have been made and the mine is now in fairly good condition. It employs about 370 mine men when operating at full capacity, but this number will not be given work for some time.

Columbus—J. M. Roan, Ohio mine inspector and safety commissioner, has issued a bulletin which deals with records kept by operators of their employees. Mr. Roan announces that he finds after investigation that mine managements are very careless in regard to keeping records of the men who are working in the mines, permitting them to enter in the morning and leave in the evening, without any record having been kept. He further finds that persons have been permitted to enter mines who are not employed and without having secured a permit to do so. This is a dangerous practice and should be stopped. He holds that all employees entering in the morning should be checked in and out on leaving in the evening. This can be done without extra expense to the operator, and is to the operator's interest, as well as to that of the miner. This especially applies to shaft and gaseous mines. Mr. Roan holds that under no circumstances should a person be allowed to enter a mine who is not employed by the company until he has been given a permit to do so by the mine boss or superintendent and points out the danger of such a practice.

Coshocton—Trouble over the price of "dead work" at the Warwick mine, near Coshocton, recently resulted in the walking out of about 100 miners. A dispute arose over the price for handling the false roof.

Athens—Sunday Creek mine No. 211 was sealed by officials of the state mining department after a fight against a fire which is raging in the old workings of the mine. The fire broke out May 29 and nearly a score of men were overcome by the gas while the main shaft was being sealed. The mine must remain sealed for from three to six months and perhaps longer. Open-flame lamps are declared to be responsible for the fire.

St. Clairsville—The settlement of the eastern Ohio strike is causing a boom in the Belmont County marriage-license business. The 15 days from the settlement of the strike to June 1 show twice as many licenses issued as during the first half of the month.

INDIANA

Indianapolis—The Union Trust Co. has been appointed receiver for the Marion Coal Co. of this city. The assets are given as $15,000 and the liabilities at $18,000.

Terre Haute—Five hundred miners employed at the Speedwell and Lower Vein mines have been called out on strike. They allege that the superintendent has been forcing the men to pay $10 for jobs, discharging them and compelling them to pay it over again.

Three deeds transfering the coal rights of 376 acres of land in Fayette township in the northwest part of Vigo County have been filed for record here, although they bear date of 1910. The Bunsen Coal Co., an Illinois corporation, now holds the rights.

ILLINOIS

Herrin—By the closing down of two large mines here 765 miners have been thrown out of employment. Several hundred have been thrown out of work at Carterville by the closing of the big Burr mine there.

Belleville—The Superior coal mine, near here, has resumed after having been closed down a long time. Resumption was made possible by the closing of a contract with the East St. Louis Suburban Electric Ry. Co. for the disposal of the screenings. The mine employs about 100 men.

Springfield—Several mining properties in the Springfield district were temporarily disabled because of a terrific storm which swept over that section last week. As a result some of these mines will be idle for a week or 10 days until repairs can be made. The mines of the Peabody Coal Co. at Sherman and Pawnee resumed operations for one day recently in order to furnish sample shipments of coal for the Union Pacific Ry., which is about to award a contract for coal to be supplied through the Kansas City Terminal amounting to 30,000 tons per month.

FOREIGN NEWS

Fairbanks, Alaska—George A. Estabrook, owner of a placer claim on Chicken Creek in the Forty-mile district on the upper Yukon, has been granted the first permit to mine coal in the interior under the new Federal leasing law.

Toronto, Can.—The Crows Nest Pass Coal Co. of Fernie, B. C., is about to install a complete system for the treatment of byproducts, which have so far received little attention. President Elias Rogers has been in Europe securing plans for the necessary machinery. The company will produce ammonia, ammoniacal liquor and benzol ready for marketing, but for the production of tar an additional plant will be required.

PERSONALS

Michael Scollard of Brazil, Ind., has been appointed Indiana state inspector of mines.

Stephen H. Payne has been placed in charge of the newly established New York office of the Hirsch Electric Mine Lamp Co. at 30 Church St., New York.

E. L. Douglas, of Hazard, Ky., general superintendent of the Harvey Coal Co., developing a coal lease at the head of First Creek in Perry County, Ky., on the First Creek Branch of the Lexington & Eastern division of the Louisville & Nashville R.R., will shortly change his address to Typo, Perry County, Ky.

Kieran Donahue, of Girardville, Schuylkill County, Penn., has been notified that he has passed the examination for mine inspector, and it is likely that he will be appointed to succeeed John Curran, inspector of the 18th anthracite district, who recently died. Thus far none of the new applicants except Donahue have been notified of success.

Chief Earl Henry was recently named by the Governor of West Virginia to succeed himself as inspector of the Bureau of Mines. Mr. Henry then announced the appointment of three mine inspectors as provided for by the enactment of the new mining code. These men were J. G. Vaughn of Charleston, Clarence N. Orr, of Kingwood, Jackson County, and Samuel McMahan, of Wellsburg, Brooke County. It is said that Mr. Henry had 400 qualified applicants for the three positions.

OBITUARY

The body of William Woods, fireboss at the Blackwood colliery near Pottsville, Penn., was found on June 5 in the sump at the foot of the slope. It is believed he was examining the pumps when he fell into the water.

William Spence, who was known as the oldest and was at one time the best known coal dealer in Brooklyn, died at his home in that borough recently. Mr. Spence was 87 years old and had been a resident of Brooklyn for about 80 years. His father, William Spence, opened the first coal yard in Brooklyn, at the corner of Flatbush Ave. and Livingston St., then well outside of the built-up district. The yard is now out of existence but the business is being continued under the name of William Spence & Son, with realty as an added department.

John W. Reid, aged 57 years, superintendent of the Old Forge district of the Pennsylvania Coal Co., died on June 5 at Dr. Reed Burns' private hospital at Scranton, where he was under preparatory treatment for an operation for obstruction of the bowels. He had been ill for several weeks. He was a native of England, but came to Pittston when a boy and began work for the Pennsylvania Coal Co. as a door tender. He had worked 44 years continuously for this firm and had risen by faithful application from the lowest position to that of district superintendent, which he had held for 5 years. He was a resident of Moosic.

INDUSTRIAL NEWS

St. Louis, Mo.—The offices of the Missouri & Illinois Coal Co. at St. Louis have been moved from 815 Mermod & Jaccard Building to 1823, 1824 and 1825 Railway Exchange Building.

Buffalo, N. Y.—It has been planned to hold the annual meeting of the Allegheny Valley Operators' Association in Buffalo at the time of the Roberts coal picnic, which occurs on July 17.

Columbus, Ohio—Gross earnings of the Toledo & Ohio Central R.R. for April were $340,000 as against $325,691 for April, 1914. The gross for the first four months of the year was $1,314,629, a decline of $246,175 from the first quarter of last year.

Knoxville, Tenn.—The J. D. Fate Co., Plymouth, Ohio, manufacturer of the "Plymouth" gasoline industrial locomotive, has established an agency at Knoxville, Tenn., 922 Holston Bank Building, in charge of C. S. Oldroyd, formerly with the Goodman Manufacturing Co.

Kansas City, Mo.—The Kansas City Terminal R.R. was recently granted a permit by the city for the construction of

a new coal station. The station is to be built of reinforced concrete with a concrete roof. The building will cost $20,000 and is to be completed by Aug. 1.

Birmingham, Ala.—The Sloss-Sheffield Steel & Iron Co. has received a contract for 200,000 tons of coal for the Seaboard Air Line for delivery within 12 months. This company also recently closed a contract to furnish 14,000 tons to the New Orleans Street Ry. Co., New Orleans, La.

Terre Haute, Ind.—It was reported some time ago in "Coal Age" that the properties of the J. K. Dering Coal Co. in Sullivan, Vigo and Vermilion Counties had been sold. This was erroneous as the properties in question belonged to the Dering Coal Co. of Delaware, the J. K. Dering Co. of Chicago having no interest in them whatever.

Somerset, Penn.—It has been announced that the Quemahoning Coal Co. has been awarded the contract by the U. S. Government for the furnishing of fuel for the United States navy at Annapolis, Baltimore and Philadelphia. The mines of the company at Ralphton and Husband will be worked 24 hr. a day in order to fulfill the requirements of the contract.

Bluefield, W. Va.—The Crozer-Pocahontas Co. has been awarded a contract for 400,000 tons of coal to be delivered during 12 months beginning July 1, to the Navy Department at Lamberts Point. Coal under this contract had heretofore been furnished largely from Pennsylvania fields, and this contract in large measure means a clear increase in the business of the Pocahontas region.

Moundsville, W. Va.—The work of enlarging the shaft of the Mound City Coal Co. which was recently begun, is progressing rapidly. This shaft will be made wider and larger, and will be concreted from the rock to the surface. The contract for the cement work was recently awarded to the Crystal Sand & Cement Co. of Moundsville. It is anticipated that the work will be completed in about three weeks.

Coalfield, Tenn.—The Harriman & Northeastern Coal Co., a new firm, has leased a large body of coal land near here and has completed surveys for a side track and tramways. Felton Hatfield, president, is an experienced operator, being connected with the Brushy Mountain prison mines. It is stated that W. E. Brinkerhoff, former superintendent of the Coalfield Coal Co., will superintend the new operations.

Philadelphia, Penn.—For the first time in history the New York Central R.R. has representation on the board of one of the important anthracite roads. At the meeting of the board of directors of the Reading company on June 1, Alfred H. Smith, president of the New York Central, was elected to take the place of Charles C. Harrison, resigned. Mr. Smith was no doubt chosen to represent the Lake Shore interests in the Philadelphia & Reading Ry.

Pittsburgh, Penn.—The assumpsit suit of James A. Paisley, of Cleveland, Ohio, against the Rail & River Coal Co. in the District Court of Pittsburgh resulted in the award by a jury of a verdict for $403,523. This amount includes the verdict of $339,000 with interest at 6 per cent. from Apr. 1, 1912, to June 3, 1915. The suit arose over a 10 per cent. commission on the sale of coal mines and properties to the Grand Trunk Development Co. of Canada through Charles W. Hayes, of Toronto.

Philadelphia, Penn.—The increase of bituminous coal exports from this port continues. Recently several ships took on cargoes of coal for the Italian Government. The British Government has placed an embargo on all shipments of native coal to other than British possessions. As a consequence English contractors are making heavy purchases in the United States to fill their foreign contracts. The great difficulty is to secure sufficient bottoms and when the vessels are available the rates are quite stiff.

Huntington, W. Va.—Referee T. R. Shepherd recently held a deed of trust for $14,813, on the property of the Mingo Washed Coal Co. of Matewan to be valid. After the Mingo company had filed a petition in bankruptcy, the creditors made an effort to have the deed of trust held by the Merchants' Bank of Pittsburgh thrown out. Following several hearings Referee Shepherd announced his decision. About $30,000 in claims has been filed against the property of the Matewan concern, the property of which has been appraised at $23,389.

Uniontown, Penn.—It is understood here that the sale of some 76 acres of J. V. Thompson coal land located at Revere recently at the rather high price of $2000 an acre to the Rainey interests is but the forerunner of some large transactions which will clear the commercial horizon of this and nearby counties. No sooner was the sale confirmed by the New York court than negotiations were begun looking toward acquiring a large portion of Fayette and Greene Counties by a syndicate representing the most powerful coking interests of the country. Definite announcement of the result of these negotiations is anticipated within a short time.

Cincinnati, Ohio—The famous case of McKell against the Chesapeake & Ohio Ry. Co., the third trial of which resulted some time ago in a verdict of $125,000 in favor of the plaintiff, and which was affirmed by the United States Circuit Court of Appeals, has virtually been ended by the action of the United States Supreme Court in denying the defendant's application for a writ of certiorari. This means that the judgment, with interest and costs, must be paid, the total amount due being about $135,000. The case has been pending since October, 1902, and has excited much interest.

Toledo, Ohio—The steamer "Viking" was sunk, with more than 2000 tons of hard coal aboard, about a week ago. The steamer arrived here from Buffalo with her cargo and the steam was blown from her boilers one night for the purpose of renewing her funnel. The deck siphons were in some manner overlooked and being left open and under water, the vessel filled during the night and sank in 25 ft. of water at the docks of the Ironville Dock & Coal Co. After four days of hard work including the building of a cofferdam around the vessel it was successfully floated.

Philadelphia, Penn.—Another of the large mining companies recently announced that, in accordance with the recommendation of the Bureau of Mines, it has discarded the use of fuses for exploding blasts and substituted in their stead electric batteries. This, of course, is brought about on the score of safety to the miners. However, another important reason may have actuated the change, although not probably so well known. Miners have been at times so careless in handling fuses that the latter have found their way into coal prepared for market, which has resulted in several instances in claims being presented for damages due to exploding furnaces and stoves.

Baltimore, Md.—The business of the Wells Light Manufacturing Co., Jersey City, N. J., has been acquired by the Alexander Milburn Co., of Baltimore, Md. Repair parts for outstanding Wells lights will be manufactured and supplied in the future by the Alexander Milburn Co. from its Baltimore factory, and complete Wells oil lights will also be furnished where desired, in conjunction with the standard Milburn acetylene lights. The manufacture of Wells oil preheating burner outfits will be continued by the Milburn company and sold in connection with Milburn oxy-acetylene apparatus. The Wells lights and Wells preheating devices have been on the market for about 20 years, and have occupied a leading place among oil-burning equipment of their kind.

Birmingham, Ala.—Walter Moore, of Birmingham, and Eastern associates have just purchased from Steiner Brothers and Frank Nelson the Empire Coal Co., whose holdings consist of 17,000 acres of coal lands valued at one and a half million dollars. The land is some of the most valuable in the state. It is 22 miles from Birmingham on the Frisco railroad near the Southern, also the Warrior River. The name of the company will remain the same. The new owners own the Panama Coal Co. with 27,000 acres of coal lands adjoining their new possessions. The output from the combined properties is 1500 tons per day, and the present intention is to increase the tonnage to 2500 tons per day. Walter Moore is president and general manager, W. C. Hamilton, secretary and treasurer.

New York, N. Y.—The Mashek Engineering Co. of No. 90 West St., New York, manufacturer of metallurgical, coal-mining and briquetting machinery, reports that it has completed and recently shipped a complete briquette-plant equipment, capacity 20 tons an hour of small size domestic fuel, to the Delparen Anthracite Briquet Co. of Parrott, Va., and another plant equipment of the same size to the Stott Briquet Co. of Superior, Wis. It has recently secured orders for complete briquetting plants from the Gamble Fuel Briquet Co. of Harrisburg, Penn., and from the New Jersey Coal Mfg. Co. of Camden, N. J. It also reports an increasing number of inquiries on briquetting machinery from prominent coal producers. The business prospects appear brighter now than they have at any time during the last four years.

Bluefield, W. Va.—The shipments of coal from Hampton Roads during May proved to be the greatest for any one month on record, amounting to a grand total of 1,307,747 tons. Of this amount the Norfolk & Western piers dumped 716,002 tons, the Chesapeake & Ohio piers 372,472 tons, and the Virginian piers 219,173 tons. The May shipments were at the rate of approximately 16½ million tons per year, while their value during May reached approximately $4,000,000. Steady increases in coal shipments from Hampton Roads have taken place for several months past, and it is predicted that these will increase for some time to come. Many countries which formerly depended on England for their fuel supply, are now obliged to come to the United States for coal. During May in addition to the marked increase in the export of coal to Europe, cargoes for South America were noticeable in increasing numbers.

Coal Trade Reviews

General Review

May anthracite tonnage suffers a sharp decline and prices are weak. Bituminous exports approximately doubled but situation still unsatisfactory. Outlook more encouraging but hesitating over the crisis in diplomatic circles.

With the strongest sizes of anthracite selling well down to the April circular and supplemented by additional inducements in the shape of long-term credits to the buyer, there is little of an encouraging nature in the hard-coal situation. It is probable that the unseasonably cool weather, which induced some buying, has prevented a more or less general demoralization; as it is the trade is about as dull as it well could be. The steam sizes are subjected to the same pressure that marks the bituminous trade except in the rare instances, where manufacturers are crowding operations on rush war orders. Contrasted with the heavy shipments of April, the May tonnage showed a decline, pulling the gross shipments for the year down to half a million tons less than last year. Tangible evidence of the strained conditions in diplomatic circles is adversely affecting the situation still further.

A general smashing of all previous high records at the chief exporting points occurred last month, but it is clear that this off-shore business cannot attain to sufficient volume to relieve the pressure on the bituminous market. On the other hand it is believed that some effects of the long talked of improvement in industrial conditions are beginning to be felt, particularly in New England. There are well defined evidences of an advancing tendency, although consumers as a rule are well stocked up, and it will take a sustained movement for some time to clean up the surpluses, and create any activity. In the meantime the coal trade is marking time with the agencies watching developments closely and competing aggressively for any new business that appears. The Pittsburgh district is again experiencing beneficial results from the export trade and there is a better feeling in steel circles, which is affecting the coal market.

The stronger position of the West Virginia operators because of the heavy demand at Tidewater is having a steadying effect upon the Ohio situation, which is being further supplemented by an exceptionally favorable crop outlook in all directions. There does not seem to be a large volume of coal emanating from the districts where the labor situation has been cleared up and prices are generally maintained at the circular, although this is at a low level.

There is a barely perceptible improvement in the Middle West. Consumers are absorbing slightly more coal, while requisitions on contracts are a trifle heavier. Railroad buying as a rule, continues at a minimum, although one important system has just placed a large storage order and a considerable tonnage will be required by the middle of next month when crops begin moving. Additional manufacturing plants are beginning to resume operations on a curtailed basis, while others are increasing their working schedules, although none of the improvements are of large proportions as yet. It is generally felt that the market has finally turned the corner, and although the improvement may be subject to future developments, it will be well maintained and along conservative lines.

A Year Ago—Anthracite storage bins glutted with steam sizes and initial curtailment in operations inaugurated. Further shrinkage in bituminous demand and trade continues under heavy stress. Improvement in Lake shipping creates a more hopeful undertone.

BUSINESS OPINIONS

BUSINESS CONDITIONS

Situation hinging entirely on developments in the international situation. Highly favorable crop report. Steel operations show further expansion.

Dun's—A waiting policy always hinders business to some extent, and the hesitancy engendered by the foreign complications tends to arrest the progress warranted by the intrinsic soundness of underlying conditions. Even though the weather has proved an added drawback in many sections, the forward movement has not been wholly checked.

Boston News Bureau—The situation continues to be dominated by the pending diplomatic negotiations with Germany. But in the meantime the country is gradually pushing forward. War orders remain at their maximum, and general trade is increasing all the time in volume. Some of the closest students of conditions are becoming confident that we are facing a period of inflation. This would not only mean higher prices for commodities but increased values for securities.

Bradstreet's—Final distribution, checked in the East by unseasonable weather, has been revived in the West by sunshine and warmth; speeding up is the rule in industrial lines, and war orders, taken on close to a cash basis, tax the capacity of many plants, spread activity to other lines, make for competitive bidding for skilled labor and hence unemployment is steadily decreasing.

The Crop Report—Winter wheat shows a slight deterioration but the wheat area planted is 59,417,000 acres as compared with 53,377,000 a year ago, and the indicated crop is 950,000,000 bushels as against 900,000,000 a year ago. The estimated oat crop is 1,288,000,000 bushels compared with 1,216,000,000 for the same period a year ago.

Marshall Field & Co.—Sales and current shipments for the week show a very satisfactory comparison with those of the same period a year ago. More customers have visited the market than during the same week last year.

Coke—Increased steel operations have precipitated a sudden large inquiry for second-half furnace coke. Higher prices are expected soon and a labor shortage is anticipated after a moderate increase in production. (For complete details see p. 1046.)

Am. Wool and Cotton Reporter—The wool situation is decidedly better. Wool is plentiful, but very firm and advancing. Big sales took place all through the week; as for some time, sales were chiefly confined to foreign wools. The dye stuffs situation is still serious. The interest in war contracts seems to have declined to a certain extent. In the cotton goods market sales have been slightly larger than a week ago. Distributing is pretty regular. There is a tendency to postpone placing contracts for future delivery and an increase in spot business.

Engineering News—For the first time this year the contemplated building operations from plans filed aggregate a larger total than in the corresponding month last year. In 69 cities, all over the United States, the cost, from plans filed in May, amounts to $69,326,000, compared with $67,477,000 in the same month last year.

Iron and Steel—The decision that the United States Steel Corporation was not a monopoly under the terms of the Sherman law was the most welcome piece of news brought forward in many months. The placing of the Pennsylvania order for 165,000 tons of rails on Wednesday clears up a matter of long standing. This is one of the very large orders for rails placed in recent years. The production of iron in May amounted to 2,263,470 tons according to "The Iron Age." This is the largest output in any single month since April, 1914.

A change for the better, as far as increasing the capacity of steel plants is concerned, may now be expected and operations are already increased to about 80% capacity. It is recognized that the capacity of the steel companies has not kept pace with the growth of the country. Sellers of pig iron are more cheerful but there have been few sales. The market for finished products is much stronger particularly small rounds and materials for shipment abroad.

ATLANTIC SEABOARD

BOSTON

Hampton Roads shippers disposed to make competitive prices and in close touch with buyers. Export demand sags a little. Industrial situation shows slight improvement. Georges Creek still coming forward slowly. Pennsylvania grades and anthracite unchanged.

Bituminous—The present market on Pocahontas and New River can be described as marking time. The recent successful bid of one of the Pocahontas factors for furnishing naval

colliers shows that West Virginia operators intend to remain in the market on a competitive basis. A large share of this contract last year was let on coal from central Pennsylvania, and it was expected the same thing would occur this year. Buyers in this territory are closely following all such developments, but while they are still tempering the market, no sales of any consequence can be reported. The fact that the export business is getting spasmodic again on account of the shortage of steamers keeps sales agents in close touch with buyers here. Aside from scattering instances, however, the price level f.o.b. Hampton Roads remains about the same as a week ago.

Not only is the New England industrial situation somewhat improved in special lines, but there is increasing evidence of more confidence in the outlook for fall and winter. Several lines of textiles report a better demand for goods, and if that is sustained for a few months it will give a much different tone to the coal situation than has prevailed the past year or so. For the present not much effect is expected because stocks of coal are large and every manufacturing plant having a contract has been crowded to accept deliveries.

On cars, for inland delivery, the demand is light. There is less coal offering, however, and prices continue as when last reported.

The heaviest volume of Georges Creek is still being routed to Baltimore for export, only small amounts coming through via Philadelphia and New York. New England buyers are now obliged to be forehanded about arranging for shipments of this grade.

The quality grades from Pennsylvania districts are coming forward fairly consistently. There is no snap to the demand, but the aggregate tonnage is considerable. The grades that sell at less prices are druggy in every direction. The strengthening in Hampton Roads prices has not progressed far enough to cause any extra demand for the steam coal shipped via Philadelphia and New York.

Water Freights are about stagnant and reflect the dullness of the trade; 40c. is now the top rate out of New York for Long Island Sound ports.

Anthracite—Slow loading is general with the larger shippers, but more because of light mining than for any other reason. If output continues on the same basis most of the companies will have business enough for the whole of June. The cool weather is having a favorable effect on retail trade.

Current prices on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$0.85@1.40	$1.20@1.60	$1.67@1.77	
Philadelphia*	2.10@2.65	2.45@2.85	2.92@3.02	
New York*	2.40@2.95	2.75@3.15	3.22@3.32	
Baltimore*	.....	.....	2.85@2.95	
Hampton Roads*	.....	.....	.....	$2.75@2.85
Boston†	.....	.....	.....	3.70@3.78
Providence†	.....	.....	.....	3.60@3.73

* F.o.b. †On cars.

PHILADELPHIA

Only continued cold and rainy weather has prevented utter stagnation. Despite offerings at low prices there is practically no response from buyers. No marked change in bituminous.

Anthracite—If anything the collieries as a general thing are on shorter time than last week. The unusual weather, cold and rain, have had a slight effect on business which would otherwise be almost at a standstill under normal conditions.

Of the domestic sizes stove, as usual, is well taken care of under restricted mining, although a few offers of this size are noted at the April circular with long-term credit. Even with these inducements there do not seem to be many takers.

About $2 continues to be the ruling price of pea coal, with offers right along of somewhat less than that figure, although $1.75 seems to be about the minimum. The continued low price of pea coal has tended to curtail the movement of the family grades; many retail dealers are offering this size at a price which shows a wide gap between it and egg, stove or nut. There are many who believe that the $2 price will continue until the first of the year, when the expiration of the agreement with the miners at the end of March will result in the storing of coal for reserve and thus cause a stiffening of the entire market.

The steam sizes still lag, due to the fact that many of the factories are still on reduced time, the only plants working to capacity being those affected by the war.

Bituminous—There is no particular action, but operators are becoming more hopeful. War orders and the recent decision in favor of the Steel Corporation have had the effect of putting courage into the business and an increased tonnage is naturally looked for. Tidewater movement shows a tendency to increase, especially since Italy's entrance into the war, which is calling for the exportation of considerable tonnage to that nation.

The standard prices rule as follows, with individual offerings of from 10c. to 30c. from those quoted:

	Line	Tide
Broken	$3.20	$4.45
Egg	3.45	4.70
Stove	3.70	4.70
Chestnut	3.85	4.95

NEW YORK

Outputs closely regulated and little spot bituminous is being offered. Anthracite fails to show any improvement. Stocks plentiful and mine operations curtailed.

Bituminous—Shippers are waiting for better conditions and have about decided that they will not be realized until fall. Operators are endeavoring to prevent overstocking the market. Those in the upper fields are working about half time while the mines in the Pocahontas, George's Creek and New River regions are doing a trifle better, due to the increased export demand.

Operators in southern West Virginia and Kentucky continue to have labor troubles. The matter of car shortage is not one of moment at this time. There has been some good bunker business. Gas coal is in good demand but prices are low.

The local docks continue to be well supplied, but there is no surplus to cause any trouble. Contract holders continue to take more than their contracts call for. Shipments to Long Island Sound and New England points continue normal. Demurrage coal is scarce and the spot market remains quiet. Quick buyers are able to pick up a few cargoes at low prices.

The export situation continues to be the feature of the market. Shippers are optimistic and look for a still heavier call. Bottoms are not more plentiful than last week and rates remain about the same. New inquiries continue to be received.

Prices on the various grades of bituminous coal have not changed materially from last week which we continue as follows:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$3.30@3.40	$3.30@3.40	$3.30@3.40	$1.75@1.85
Georges Creek Tyson	3.00@3.10	3.00@3.10	3.00@3.10	1.45@1.55
Clearfield:				
Medium	2.65@2.80	2.55@2.65	.....	1.10@1.25
Ordinary	2.55@2.60	2.55@2.60	.....	1.00@1.10
Broad Top Mountain				1.10@1.45
Cambria County:				
South Forks	2.90@3.05	.....	.....	1.35@1.50
Nanty Glo	2.75@2.80	.....	.....	1.20@1.25
Barnesboro	2.65@2.70	.....	.....	1.10@1.15
Somerset County:				
Quemahoning	.....	2.70@2.85	2.70@2.85	1.20@1.30
Medium	2.65@2.70	2.60@2.65	2.60@2.65	1.10@1.15
Latrobe	2.45@2.55	.....	.....	0.90@1.00
Greensburg	2.75@2.80	.....	.....	1.10@1.15
Westmoreland	2.95@3.20	.....	.....	1.15@1.40
West Virginia Fairmont ¾		2.60@2.70	2.60@2.70	0.80@0.90
Fairmont mine-run		2.50@2.60	2.50@2.60	0.70@0.80
Steam		2.45@2.50	2.45@2.50	0.90@0.95
Western Maryland		2.35@2.45	2.35@2.45	0.80@0.90

Anthracite—It is difficult to find any signs of improvement in the anthracite coal market. Indeed, some shippers believe the situation, especially at Tidewater, is duller than a week ago. Some inland dealers complain that shipments are not as prompt as they might be. Salesmen report a better demand inland than locally.

Most of the companies are endeavoring to work their mines on an average of about four days a week, while many of the individuals are not doing as well. Efforts are being made by all to prevent a slump in the market. The outlook for the balance of the month is not promising. In some instances coal has been quoted by individuals at April circular but these are scarce.

The curtailed operations do not seem to diminish the stock of steam sizes. Pea coal is selling at considerable below the companies' circular. The buckwheat sizes are much in evidence and a quick buyer can supply his immediate requirements at almost his own figures.

Quotations are as follows:

	Lower Ports		Upper Ports	
	Circular	Individual	Circular	Individual
Broken	$4.75		$4.80	
Egg	5.00	$4.80	5.05	$4.85
Stove	5.00	4.80	5.05	4.85
Chestnut	5.25	5.00	5.30	5.05
Pea	3.35@3.50	3.10@3.35	3.40@3.55	3.15@3.40
Buckwheat	2.50@2.75	2.25@2.50	2.55@2.80	2.30@2.55
Rice	2.00@2.25	1.90@2.10	2.05@2.30	1.95@2.25
Barley	1.75@2.00	1.60@1.75	1.80@2.05	1.85@2.10

ANTHRACITE OPERATIONS

The "Philadelphia News Bureau" reports mine operations at the anthracite collieries as follows:

Philadelphia & Reading Coal & Iron Co.—This company operated three days during last week.

Susquehanna Coal Co.—This company operated three days during last week.

Lehigh Valley Coal Co.—The mines of this company were closed on Monday and Tuesday of this week and it is the present intention to run about half time during the balance of the month.

HAMPTON ROADS

Dumpings for May break all previous records. Movement heaviest to Italy.

Dumpings at tidewater for the week, while heavy, have hardly come up to tonnage anticipated. As has been the case for some time Italy has taken the largest percentage of the movement although shipments for the Canal Zone come a close second. The "Achilles," a new vessel and a sister ship of the "Ulysses" which recently loaded a cargo of over 12,000 tons for the Canal Zone, has loaded for her trial trip. The movement coastwise has been chiefly to Boston, Providence, and Portland, although of course smaller cargoes have gone to the other New England ports as far north as Bangor. The shipments to New England have consisted of New River and Pocahontas mine-run, nut and slack and also a small amount of the high volatile coals. Prices at tidewater are practically stationary and there is still somewhat above the normal accumulation on hand.

During the month of May all records for heavy dumpings were broken, 1,307,747 tons being moved over the Hampton Roads piers. Of this quantity the Norfolk & Western dumped 716,002 tons, the Chesapeake & Ohio 372,472 tons and the Virginian 219,273 tons. Of the total movement over 440,000 tons went foreign, Italy being the heaviest buyer.

The following vessels have cleared from Hampton Roads during the past week:

Norfolk			Norfolk		
Vessel	Destination	Tons	Vessel	Destination	Tons
Oceano[1]	Genoa	6350	Clara Donnell	Teneriffe	1547
Thelma[2]	Cardenas	1880	Romford	St. Lucia	5400
Kintail	St. Vincent	5417	Newport News		
Fairmount	Rio de Janeiro	3000	Baker Palmer	Rio de Janeiro	3800
West Lands	Havana	4700	Maasdijk	Rio de Janeiro	7300
Pietro	Spezia	5462	Sif	Fort de France	4641
Tarrington	Naples	7760	Justin	Para	597
St. Theodore	Genoa	7600			
Negadisk	Canal Zone	6500			
Tancred	Canal Zone	5500			
Alicia B. Crosky	Para	1649			

[1]Pocahontas Fuel Co. [2]Baker-Whiteley Coal Co.

Railroad Tonnages—Dumpings over the local piers for the past several weeks compare as follows:

	Week Ending				
Railroad	May 8	May 15	May 22	May 29	June 5
Norfolk & Western	208,179	151,113	162,021	146,462	156,011
Chesapeake & Ohio	88,609[1]	80,045	84,286	83,678	44,702
Virginian	45,116	57,903	39,431	61,688	38,372
	341,904	289,061	286,638	291,828	239,085

[1] Nine days.

OCEAN FREIGHTS

During the past week freight rates were slightly easier on large steamers, both to the Plate and to the Mediterranean, principally owing to the scarcity of large orders; on the other hand rates on small boats to South American ports were firm. Freights to other destinations are unchanged.

To	Rate	To	Rate
Havana	$2.00@2.25	Bermuda	$3.50@3.75
Cardenas or Sagua	3.00@3.25	Vera Cruz	**3.50**
Cienfuegos	2.50@3.00	Tampico	**3.50**
Port au Spain, Trinidad	3.75@4.00	Rio	8.64@8.76
St. Lucia	3.50@3.75	Santos*	8.88@9.12
St. Thomas	**3.25**	Montevideo	7.44@7.92
Barbados	3.75@4.00	Buenos Aires or La Plata	7.68@8.16
Kingston	2.75@3.00	Rosario	8.40@8.64
Curacao	3.75@4.00	West Coast of Italy	10.56@10.80
Santiago	2.75@3.00	Spain**	9.60@10.08
Guantanamo	2.75@3.00	Valparaiso or Callao	**7.20**
Demerara	5.00@5.50	Marseilles	9.60@10.68

Note—Rates noted in **bold face** type are only approximate.
*Consignees paying dockage dues. **Spanish dues for account.
W. W. Battie & Co.'s Coal Trade Freight Report.

BALTIMORE

Trade is full of conflicting reports, largely because of the large export business which is breaking all records. Home trade undoubtedly dull.

The companies figuring in export trade are undoubtedly handling much coal, while those relying entirely on the home market are for the most part dull. This includes a large number of companies that sell to the trans-Atlantic liners which are now running very irregularly. The May report of the Consolidation Coal Co., one of the heaviest shippers in the foreign trade, shows that it broke the previous production record by nearly 100,000 net tons.

May exports from Baltimore broke all records. A total of 232,866 tons was sent to foreign account. Italy took the largest amount, 89,105 tons. Argentina was second with 80,590 tons.

The domestic market is very flat and little new business is developing. Low-grade West Virginia and western Maryland coals are still offering very cheap to the trade at the mines. Pennsylvania line coals are a little stronger.

The following charters were announced the past week:

Vessel	To	Rate	Vessel	To	Rate
Terschelling	Plate		Germania	Piraeus	
Ashmore	Plate		Ashmore	Plate	$8.28
Ubbergen	Barrios		Astoria	Plate	8.28
Lennox	Plate		Gleneden	Naples	10.56
Llongiven	Plate		Lejre	Italy[1]	10.80
Nordland	Guantanamo		Styliani Bebis	Italy[1]	10.80
Georgias	Italy[1]	$10.80	Ontaneda	Montevideo	8.28
Tjisondari	Italy[1]	10.80	Aldgate	Rio	8.88
Samarnda	Alexandria		Dunachton	Montevideo	8.28
Meracka	Alexandria		[1] West Coast.		
Mar Mediterraneo	Algiers				

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Lennox	British	Baltimore	River Plate	2361	
Llongwen	British	Baltimore	River Plate	3013	
Eliopila	Italian	Philadelphia	West Coast, Italy	2283	$10.80
Ubbergen	Dutch	Baltimore	Puerto Barrios	1150	
Nordland	Danish	Baltimore	Guantanamo	1042	
Sif	Norwegian	Baltimore	Martinique	1959	
Marosa (ship)	**Norwegian**	Hampton Roads	Rio Janeiro	1882	7.75
William E. Downes		Newport News	San Juan, P. R.	639	2.70
Emma F. Angel		Baltimore	Calais	819	
Atlantic		Baltimore	Buenos Ayres	3348	7.68
Astoria	British	Baltimore	River Plate	2743	10.44
Orion	Swedish	Philadelphia	Rosario	2158	
Margam Abbey	British	Virginia	Rio Janeiro	2778	8.76
Geo. E. Klinck		Philadelphia	Halifax	460	1.75
Mary A. Hall		Philadelphia	St. John, N. B.	341	
Harry W. Haynes		Philadelphia	Stockton Springs	256	
Ashmore	British	Baltimore	River Plate	1574	8.28
Terschelling	Dutch	Baltimore	River Plate	1872	
Samarinda	Dutch	Baltimore	Alexandria	4423	
Merauke	Dutch	Baltimore	Alexandria	4298	
Germanic	British	Baltimore	Piraeus	2171	
Marmediterraneo (new)	Spanish	Baltimore	Algiers		
Glen Eden	British	Baltimore	Naples	3018	10.56
Lejre	Danish	Baltimore or Virginia	West Coast Italy	1854	10.80
Georgios	Greek	Baltimore or Virginia	West Coast Italy	2077	
Tjisondari	Dutch	Baltimore or Virginia	West Coast Italy	8039	
Dionysios Stathatos	Greek	Norfolk	Bilbao	2296	9.54

Note—Steamers are indicated by **bold face type**, all others being schooners.

LAKE MARKETS

PITTSBURGH

Considerably increased inquiry for export purposes, chiefly to Italy. Manufacturing demand slightly improved. Lake shipments light. Operations at about 60 per cent., with no shortage of men or cars.

Pittsburgh district shippers, particularly those in the Connellsville region, have been finding a much heavier demand for export coal, doubtless arising chiefly from the entrance of Italy into the war, with the consequent stoppage of coal shipments from Germany to that country. There are decidedly cheaper markets for Tidewater shipment, of course, but some of the export requirements can be met by only a few districts.

There is a slight improvement in coal demand from manufacturers, and particularly the steel industry, as after a short halt the improvement in steel is now proceeding apace.

Shipments in the Lake trade continue light and while they are increasing somewhat it seems probable that anything like full shipments will hardly be reached before about Aug. 1, early prognostications having been that the normal rate would be attained by about July 1.

Mine operations are at a slightly better rate, probably averaging close to 60% of capacity. There is no shortage of labor, of course, with such operations. Car supply is fair but does not seem to be excessive.

No interest has been revived in the contract market, prices for free coal being so much below contract-asking prices, which remain about $1.15 for mine-run to Apr. 1 and about $1.15 for ¾-in. coal for the Lake season. Free coal continues to be quotable about as follows: Slack, 55@60c.; nut and slack, 90@95c.; nut, 95c.@$1; mine-run, $1@1.05; ¾-in., $1.10@1.15; 1¼-in., $1.20@1.25, per net ton at mine, Pittsburgh district.

BUFFALO

Agencies pushing hard for business and orders difficult to obtain. Anthracite also heavy and Lake trade is slowing up.

Bituminous—The general report is not satisfactory. Business is difficult to obtain and very little comes in unsolicited. Agencies are pushing hard for business and prices are so badly cut that profits are small. Former predictions of a revival in buying after the end of June are no longer heard and not much is anticipated now before the fall. As a rule the bituminous mines are running half time or less and in some instances it is hard to give the miners enough work to support them.

There is some coal that brings the full circular price, but it must be of the highest quality and in the hands of capable salesmen. Quotations are based on $2.70 for best Pittsburgh lump, $2.55 for three-quarter, $2.45 for mine-run and $2.25 for slack. Allegheny Valley sizes are about 25c. lower than Pittsburgh. The light demand for coal in the Lake trade at ports west of here throws a large amount of it on this market that would otherwise not come here.

Anthracite—Everything in the trade is about as dull as it can be. There was a little improvement at the end of May on the part of a few jobbers who wanted to take advantage of the ten-cent difference in price, but that promptly subsided when June came in.

The activity in Lake shipping is not quite what it was, though the week's total is only a trifle under 100,000 tons. For the month of May the shipments amounted to 548,437 tons and for the season, 802,142 tons, as against 603,446 tons to June last season. Some of the shippers have about stopped forwarding anthracite to the Upper Lake docks, as it is piling up fast there. Within the last few days it has come in more slowly from the mines, either on account of mining suspension or demand eastward.

TORONTO, CAN.

Market continues well stocked and prices remain at a low level.

The yards continue well stocked in all lines and supplies are coming forward freely both by rail and water. The water in the harbor is 18 in. lower than usual at this season and on 3rd inst. the collier "Veronica," from Oswego, ran aground at the entrance at Eastern gap in about 12 ft. of water. The only change in prices is an advance of 50c. for cannel coal. Quotations for best grade are as follows: Retail, anthracite, egg, stove and nut, $7.50; grate, $7.25; pea, $6. Bituminous, steam, $5.25; screenings, $4.25 to $4.50; domestic lump, $6; cannel, $8; wholesale f.o.b. cars three-quarter lump, $3.56; screenings, $2.90.

TOLEDO

Both ore and coal movements light. Dealers anxiously watching for railroad contracts.

Toledo is still a quiet market and this condition is likely to prevail until the Lake coal starts moving more freely. The domestic market is slow but Kentucky and West Virginia coals are in some demand for threshing purposes; the large crops would indicate that this trade will be heavy when fully under way. Steam trade continues quiet. Prices on practically all grades are running close to the list in actual sales although the listed quotations are low.

Lake coal passing through here this season amounted to 1,108,725 tons and the Canadian shipments amounted to 92,487 tons. These figures show considerably less than a normal movement. Occasional small contracts are coming in from private individuals for summer coal and small institutions which are placing fair orders. Larger contracts will not be let until later in the summer although dealers are expecting some railroad orders of considerable size to come in at any time.

COLUMBUS

A slight improvement reported from most districts. Prices steadier and the tone of the trade is better. Some stocking reported.

The trade reports a better feeling in the market with prospects for the future looming up brighter. This is due primarily to the disposition on the part of West Virginia operators to hold their coal for higher quotations and not sacrifice it in Ohio markets. For the past few months there has been much cheap coal in Ohio and prices have been cut ruthlessly. But operators are now going slower and as a result a greater steadiness is noted on all sides.

The steam trade is still rather slow as manufacturing is improving very slowly. It is true that factories making war munitions have all they can do but other lines of manufacturing are slow. Buying off the open market still prevails. In many cases where contracts have been renewed a concession in price is required. Railroads are taking a fair amount of fuel.

In domestic lines there is not much activity noted. Some stocking of the fancy grades such as Pocahontas, splints and white ash is reported but the movement is not yet general. There is practically no stocking of Hocking, though some Pomeroy coal is being bought for stocking purposes. The retail trade is slow although prices are generally maintained at former levels. Dealers are not inclined to sell at low figures, being content to wait for better conditions. Retail stocks are only fair.

Lake trade is showing some increase although some of the large companies will not start shipments until after July 1. Docks in the Northwest are still congested and the interior movement is limited. Many operators are loath to invest money in Lake shipments without brighter prospects. Chartering of boats is not very active.

Mines have been working at about the following percentages of full capacity.

	Week Ended					Week Ended			
District	May 15	May 22	May 29	June 5	District	May 15	May 22	May 29	June 5
Hocking Valley	25	25	30	30	Cambridge	35	30	35	35
Jackson	25	25	20	20	Massillon	40	35	35	35
Pomeroy Bend	50	50	45	50	Eastern O.	..	5	15	25
Crooksville	25	30	35	35					

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.45	$1.50	.....
Inch and a quarter	1.30	1.35	$1.30
Three-quarter inch	1.25	1.30	1.25
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	.70	.75	.65
Coarse slack	.60	.70	.55

CLEVELAND

Lack of Lake orders has curtailed the shipment of fine coal, but not sufficient to have a marked effect on current prices. Lake shipments falling behind.

Eastern Ohio mines are shipping a little coal into this market. Slack is selling at $1.50 to $1.55, mine-run at $1.85 to $1.90 and three-quarter at $1.95 to $2. These are current spot prices from local operators, and except on mine-run and three-quarter would not hold good for shipment. It would be impossible to place an order for five to ten cars a day of No. 8 fine coal at anything like these prices and probably such an order would be very hard to place as the operators have no outlet for their coarse coal.

The ruling prices on fine coal this week are $1.55 to $1.60. Youghiogheny operators have had Lake shipments curtailed and are holding their prices a little more firmly. Fairmont is comparatively easy.

Lake shipments fell off during May as compared with a year ago. Lake Superior shipments in May 1915 totaled 248,110 tons of anthracite and 1,248,447 tons of bituminous as compared with 248,694 tons of anthracite and 1,903,425 tons of bituminous last year. All of the larger shippers took very much less coal to June 1 than a year ago. A few of the shippers ran ahead of last year, but their docks are filled now and they are putting in stop orders.

In domestic coals there is plenty of smokeless mine-run, but a shortage of prepared sizes. The operators cannot take care of the fine coal. The Lakes are not furnishing the outlet this year and are not likely to until about Aug. 1.

Prices for shipments are as follows:

	Pocahontas	Youghiogheny	Bergholz	Fairmont	W. Va. No. 8
Lump	$3.10	.....	.....	.....	.....
Lump, ¾ in.	.....	$2.20	$2.00	$1.85@1.90	$1.95
Egg	3.10	.....	.....	.....	.....
Mine run	2.65@2.70	2.10	1.85	1.80@1.85	1.85@1.90
Slack	.....	1.65	1.60	1.60@1.65	1.50@1.55

CINCINNATI

Sluggishness in all quarters. Steam contracting has not improved.

Even smokeless coals are beginning to feel the depression despite the relatively small supply and the active demand which nearly always keeps these in first-class shape. The tendency toward economy among consumers has also had its effect upon smokeless coal and there is a disposition to substitute a cheaper coal. Splint is dragging, as are all other bituminous coals, simply because demand is lacking. The Lake movement is very sluggish. A better feeling in the steel industry, caused by the consumption of plants handling war orders, is the most encouraging feature of the current situation.

LOUISVILLE

Mines continue on short time and steam market is softer. Heavy river shipments.

The mines generally are running on short time and are expected to continue so until July, when it is hoped that

the domestic stocking movement will increase the demand. The steam coal market is softer, due to the supplies of slack resulting from increased operations to supply the Lake trade. There is a considerable accumulation of steam sizes in the larger towns.

Sales of the last ten days have been on the basis of from $1.40 to $1.85 for block coals of best grades; $1.10 to $1.35 for egg coals; 60 to 75c. and 40 to 50c. for nut and slack, all prices f.o.b. mines.

Large tows of coal from Pittsburgh are reaching here on the Ohio River bound for New Orleans. The boats have had some trouble due to heavy fogs and have found it necessary to tie up over night on some occasions. The "Sprague," with 1,250,000 bu in 52 barges, has passed into the Mississippi River being attended by the harbor boat "Wash Gray."

BIRMINGHAM

Steam business improved. Many large contracts made. Lump coal shows some betterment. Operators optimistic.

With the closing of contracts aggregating over one million tons of steam coal during the past week, business in this district has taken a decided boost on this grade. While some of this tonnage is simply on a "re-contract" basis, about 100,000 tons of it is new business for the district, or at least these mines have not had it for over seven years.

Operators are planning to increase their tonnage, and improvements over the entire district are being made preparatory to doing a large business. New mines are being opened up, while those that have been closed are cleaning up and some have already resumed operations. Lump coal shows an improvement over last week, and if the volume of business during the balance of the month is on the same basis as the first five days, the tonnage will far surpass that of May. Prices, however, are remaining stationary, and no change is looked for, for some time. Blacksmith coal is in a satisfactory condition.

COKE

CONNELLSVILLE

Large inquiry suddenly appeared for second-half furnace coke. Higher prices expected shortly. Labor shortage anticipated after moderate increase in production.

Inquiry has suddenly appeared in volume for furnace coke for the second half of the year. There is definite inquiry for about 40,000 tons a month, and tentative inquiry for about half as much more. About two-thirds of the tonnage in prospect is for furnaces now idle but which are expected to get into blast by about July 1. There is no rush about getting idle furnaces in blast, the interest of furnacemen in the coke market being rather premature because there are signs that prices will advance after a little more coke has been disposed of. Production and shipments in the Connellsville region, about 315,000 tons at last report, show a gain of over 50% over the December average, and well posted men assert that the limit is 350,000 or possibly 375,000 tons, before a labor shortage is encountered. We quote furnace coke at $1.50 for spot, $1.60 for June and $1.75 for second half, and foundry at $2@2.40 for prompt and $2.20@2.40 for twelvemonth contracts, depending on grade, all per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended May 29 at 316,890 tons, an increase of 10,199 tons, and shipments at 315,523 tons, an increase of 10,476 tons.

Buffalo—The trade in coke has not changed of late and it could not well be more dull. Some of the more active coal salesmen are saying that the tone is better than it was, and they are looking for a material improvement shortly. Everybody is hopeful, but confidence is confined to the few. The price of coke remains on the basis of $4.15 for best 72-hr. Connellsville foundry and $3.15 for stock coke.

Chicago—The market on domestic sizes has been weak, but the foundry coke trade seems to be looking up somewhat. Prices have been steady for furnace and foundry use as follows: Byproduct, $4.55@4.75; Connellsville, $4.60@4.75; Wise County, $4.50@4.65; gas coke, $3.65@3.75; furnace, $4.50@4.75.

St. Louis—There is considerable speculation as to the factor that the St. Louis Elkhorn Byproduct Coke Co. is going to be in the market. The $2,000,000 plant of the M. W. Warren Coke Co. at Carondelet has been completed and put in blast. The company is exploiting its product extensively and urging its cheapness, efficiency and smokelessness. The daily capacity of the plant is to be 750 tons.

MIDDLE WESTERN

GENERAL REVIEW

Sluggishness still prevails but the undertone is stronger. Screenings slightly easier. Anthracite still moving slowly.

General quietness still continues, although cooler weather has had the effect of stimulating increased orders for domestic sizes. The feeling prevails that the uncertainties of the past three months are about over and that an upturn has begun which will gain considerable headway by the end of the current month. There is more of a disposition on the part of retailers and manufacturing enterprises to take larger tonnages and some standing orders on the coarse sizes have been increased.

Screenings have been softer showing an average decline of 10c. per ton but this condition is only temporary, as several large producers have no fine coal to offer on the open market. One of the more important public service corporations has just recently made inquiries for prices covering screenings to be shipped during the next two weeks, which should have the effect of stiffening quotations. The railroads continue to give minimum weekly orders for current needs, but the Chicago, Burlington & Quincy R.R. placed a large storage order with the Franklin and Williamson County operators this week at $1.15 for lump and egg.

INDIANAPOLIS

The dull period of the year is at hand and market is unusually quiet. Better railroad consumption anticipated next month.

Prices are again about as low as they ever have been in this state. This is the season when they are at the bottom every year, but the prolonged restrictions of industrial and commercial activities have kept the demand unusually low. Keen competition adds further complications but the general tone of the market is steady. Screenings can still be sold at the relatively good price of 85 to 90c. and mine-run at $1.10 to $1.20, but prices are made under these. Some mines having screenings contracts to fill are making concessions on lump coal and vice versa.

The month of May was unusually cold in Indiana and the demand for domestic lump lasted much longer than usual, but June will be so warm that the consumption of domestic grades will be at the minimum. The coal industry will not feel the benefits from the increased railroad traffic caused by the marketing of wheat and oats until about the middle of July. The demand from factories is about at the same level.

ST. LOUIS

Price cutting has demoralized the market but there is a slightly heavier demand and the outlook is more encouraging.

Although the price-war continues among the Standard operators of the inner group and the cutting is reported to have been worse during the past week than at any time since the fight began, it is understood that new prices will be announced next week and a start made toward a return to normal. The quoted prices continue unchanged, 77½c. for 2-in. and 90c. for 6-in. on the Illinois Central and 77½c. for all sizes on the Louisville & Nashville, but some sales were made for 75c. on contracts of considerable size. It is reported that a few sales were made as low as 70c., but this is doubted. The Carterville operators have kept out of the trouble and are holding up their prices.

In spite of the demoralization resulting from this price war, there is a perceptible improvement in the general tone of the market. The demand was larger for all grades the last half of May than in the six weeks preceding, due to a gradual improvement in the industrial situation. The increase has not been great but it has been sufficient to encourage the operators and dealers.

CHICAGO

Mining operations continue much restricted. Prices are not satisfactory, particularly on Kentucky grades.

Franklin County operations have been averaging a little over two days' working time per week. Screenings have been stronger from this district and have been selling as high as $1.10 per ton. Colder weather caused an increase of orders for domestic sizes, but this demand was only of a temporary nature. The Williamson County operators are in the same condition as their neighbors, and are closing down the mines or diverting their tonnage entirely to the steam trade. The producers in Franklin and Williamson County fields are still adhering closely to their organized effort to maintain prices notwithstanding market demands do not improve as fast as anticipated.

There is no demand for domestic sizes from the Harrisburg district, but screenings and steam lump for railroad use have shown increased activity.

The market for Springfield coal has been without any appreciable change during the last week. Screenings from this district have been slightly softer.

The Indiana situation has not undergone any marked change recently. The demand still continues at a low stage, and it is noticeable that shipments are now falling behind last year. Dealers are contracting for very little tonnage, and the building trade strikes in Chicago have helped to reduce shipments.

Prices on Kentucky grades are uneven, and mostly at an extremely low level. A few cars of consignment coal have again been sacrificed at disturbing prices. Demurrage coal is sold as much as 60c. per ton below list prices.

Anthracite trade is very dull, and few orders have been thus far placed for June shipment. It is evident that anthracite buying in the West this year is going to be delayed until mid-summer or later.

	Williamson and Franklin Cos.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump	$1.25@1.35	$1.25	$1.35@1.40	$1.40@1.50	$1.25@1.35
Steam lump	1.25	1.15@1.25	1.25	1.10@1.25	1.15@1.25
2½-in. lump	....	....	1.20@1.30	1.15@1.30	....
1¼-in. lump	....	....	1.10@1.25	1.10@1.25	....
Mine-run	1.10@1.25	1.00@1.10	.95@1.10	.80@1.10	.85@1.10
Egg	1.25@1.35	1.15@1.25	1.15@1.25	1.15@1.25	1.05@1.15
No.1washed	1.40	....	1.50	....	....
No.2washed	1.25@1.35	....	1.60	....	....
Nut	....	1.00@1.05	.95@1.15	.90@1.10	....
No. 1 nut	1.25@1.35	....	....	....	....
No. 2 nut	1.15@1.35	....	....	....	....
Screenings	.80@ .90	.80@ .85	.75@ .80	.75@ .85	.75@ .80

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.25@1.35	$1.15@1.35	$1.70@1.90	$1.50@1.60	$1.35@1.50
1¼-in. lump	1.25	1.15@1.25	....	....	....
Mine-run	1.00@1.15	....	1.00@1.25	1.15@1.25	....
Egg	1.15@1.25	.95@1.10	1.60@1.70	1.50	1.25@1.40
No. 1 nut	1.25@1.40	....	....	....	1.15@1.25
No. 2 nut	1.25@1.35	....	....	....	....
Screenings	.80@ .90	....	....	....	....

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for May and the first five months of 1914-15 were as follows:

	May		5 Months	
	1915	1914	1915	1914
Phila. & Reading	962,986	1,202,679	4,560,860	5,086,832
Lehigh Valley	1,273,106	1,249,218	5,311,595	4,829,093
Cent. R.R. N.J.	749,820	782,889	3,189,722	3,549,573
Del. Lack. & West	851,545	901,596	3,680,209	3,656,638
Del. & Hudson	677,108	663,648	3,105,898	2,754,627
Pennsylvania	508,272	579,869	2,523,264	2,746,436
Erie	610,305	702,892	3,053 993	3,251,852
Ont. & Western	164,819	198,762	853,661	940,552
Total	5,797,961	6,281,553	26,279,202	26,815,603

Stocks at Tidewater May 31 were 751,617 tons.

EXPORTS BY DISTRICTS

May exports by districts and states were as follows:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire	48	22	.....
Maryland	643	193,293	418
New York	19,364	2,966	40
Philadelphia	6,169	60,207	.....
Porto Rico	.....	200	.....
Virginia	.....	448,329	994
Mobile	.....	461	.....
New Orleans	15	861	5
Arizona	.....	4,004	18
El Paso	.....	20,247	9,312
Laredo	.....	859	.....
Alaska	.....	10	.....
San Francisco	1	.....	16
Southern California	2	18	....
Washington	.....	1,175	2,093
Buffalo	249,196	156,539	35,908
Dakota	271	2,770	164
Duluth and Superior	53	2,705	60
Michigan	.....	34,506	5,025
Ohio	10,500	139,484	169
Rochester	51,786	18,718	357
St. Lawrence	114,413	25,080	1,434
Vermont	1,066	214	100
Total	453,527	1,112,668	56,113

Bunker Coal

Customs Districts	April	May
New York	267,104	266,826
Philadelphia	32,948	34,600
Maryland (Baltimore)	35,265	60,783
Virginia	120,357	172,012

RATE DECISIONS

I. C. C. Nos. 6381, 6504, 6570, 6573, 6603, 6615, 6616, 6624, 6631, 6765, 6874. Lake line applications under Panama Canal Act.

Upon applications of certain railroads under the Panama Canal act for an extension of time during which their interest in the operation of certain boat lines plying on the Great Lakes might be continued; **Held:**

1. That the physical fact of ports of call being served in common by the boats and the paralleling rails of the owning railroad establishes a case of competition existing between the owning railroad and its boat line.

2. That the case is the same where the railroad entity which owns the boat line also owns, through stock control, another railroad entity, or is an integral part of a system of railroad whose paralleling rails serve ports of call in common with the boats.

3. That where an owning railroad is a party to through all-rail routes or a member of "fast freight lines" or an association of railroads owning boat lines whose function is to keep the operation of their boat lines from interfering with the rail operations, the interest it thus maintains in common with the rail carriers whose rails do compete with its boat line is such an interest as the act provides against, and that it is possible for such an owning railroad to compete with its boat line for traffic, within the meaning of the act.

4. That the purpose of the Panama Canal act was to preserve to the common interest of the people, free and unfettered, the "water roadbed" via the Panama Canal. Also to restore all the water routes of the country to the same condition of freedom from domination that would reduce their usefulness as a natural means of transportation.

5. That Congress has decreed that there shall be a restoration of conditions which prevailed when railroads had no interest in and exercised no control over the boat lines plying upon the country's water routes. The inquiry in these cases is, Is the joint operation of these boat lines such as to make of them an exception?

6. That upon the respective records herein concerned, none of the several existing specified services by water is being operated in the interest of the public or is of advantage to the convenience or commerce of the people within the meaning of the act, and that an extension of the respective interests of the petitioners therein will prevent, exclude, and reduce competition on the great lakes. The application of each of the petitioners herein is therefore denied, effective Dec. 1, 1915.

FOREIGN MARKETS

GREAT BRITAIN

Market quiet. Italian business stimulates the trade. Great uncertainty prevails regarding licenses for export shipments.

There is at present a rather quiet tone in most markets, owing to various causes, including the decline in demand for house descriptions, holiday influences, and the restrictive effects of the export regulations. The intervention of Italy in the war has afforded some stimulus in certain quarters, for the license order will no longer apply to Italian shipments, and her requirements are well known to be large. In other directions the effects of the export order have been distinctly weakening to the market. The principle on which the licenses are granted is no nearer being known than at the outset, and is the subject of much criticism. A good deal of confusion arises from the fact that licenses are granted very readily in some instances, while in others, although the coal may be of the same quality and for substantially the same destination, permission to ship is refused. The awkwardness of the situation is self-evident.—"The Iron and Coal Trades Review."

May 28—There is a good demand but supplies are scarce and prices are rising. Quotations are approximately as follows:

Best Welsh steam	Nominal	Best Monmouthshires	$7.92@8.04
Best seconds	Nominal	Seconds	7.80@7.92
Seconds	$8.40@8.64	Best Cardiff smalls	5.16@5.40
Best dry coals	8.40@8.88	Cargo smalls	4.44@4.56

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freights—Outward chartering is more active but restricted by the difficulty in obtaining adequate coal supplies. Rates are approximately as follows:

Gibraltar	$4.08	Naples	$7.56	St. Vincent	$4.56
Marseilles	4.83	Alexandria	6.00	Rio de Janeiro	6.60
Algiers	3.81	Port Said	5.28	Monte Video	6.00
Genoa	7.44	Las Palmas	4.32	River Plate	6.24

Note—These quotations are based on an exchange rate of 24c. to one shilling.

Coal Contracts Pending

The purpose of this department is to diffuse accurate information of prospective purchases and prices with a view to affording equal opportunity to all, promoting market stability and inculcating sound business principles in the coal trade.

For the official advertisements of bids wanted see the Contracts-to-Be-Let Section on Page 18.

✚Indicates contracts regarding which official information has been received.

Recast

In the following table we give a list of all old contracts coming up for consideration during the ensuing week. The table gives our contract number, the name of the purchaser, city, tonnage and page on which the detail notice appeared:

No.	Purchaser	City	State	Tonnage	Page
541	Dept. of Public Wks.	Toronto	Ont.		1004
689	H. W. Caldwell & Son Co.	Chicago,	Ill.	250[2]b	877
695	Brand Brewing Co.	Chicago	Ill.	8[1]b	877
697	Rosenbaum Bros.	Chicago	Ill.	150b	877
758	Hospital Bd.	Springfield	Ohio		955
765	Board of Education	Martinsburg	W. Va.	7	956
768	Government	Washington	D. C.	4000b	956
782	Bd. of Water Comrs.	White Plains	N. Y.	1000b	1005
787	Bd. of Hospitals	Springfield	Ohio		1005
807	Michigan Agricultural College	East Lansing	Mich.	9000b	1006

a Indicates anthracite coal. b Indicates bituminous. [1] Cars per month. [2] Per week.

Supplemental Notes

Under this heading additional or supplemental information regarding old contracts appears, together with the page number of the original notice.

✚**No. 432—Minneapolis, Minn.**—Bids on this contract (pp. 626, 707), which provides for furnishing the Board of Education with coal during the ensuing year, will be received until 2 p.m., June 15. All bids must be accompanied by certified checks for $1000. Specifications may be viewed at the office of tne Business Superintendent. Address Business Supt. Geo. F. Womrath, 301 City Hall, Minneapolis, Minn.

✚**No. 672—Charleston, S. C.**—Bids on this contract (p. 836), which provides for furnishing the Lighthouse Department with coal, have been received as follows:

		Consumers Coal Co.				Wm. Johnson & Co.			
Item	Tonnage	Coal	Ton	Gross	Cents*	Ton	Gross	Cents*	Coal
1.....	2500	Clinchfield	$3.90	$9,750.00†	12.7	$3.98	$9,950.00	12.9	Stonega
1A.....	2500	Pocahontas	4.75	11,875.00†	14.6	4.81	12,025.00	14.6	Pocahontas
2.....	1000	Clinchfield	4.10	4,100.00†	13.3	4.16	4,160.00	13.5	Stonega
2A.....	1000	Pocahontas	4.95	4,950.00†	15.2	5.05	5,050.00	15.3	Pocahontas
3.....	175	Stove	7.75	1,356.25	....	7.85	1,373.75	....	Stove

* Cents per 1,000,000 B.t.u. †Bids indicated thus have been recommended to be accepted.

✚**No. 678—New Brunswick, N. J.**—Bids on this contract (p. 876), which provides for furnishing the local Board of Education with its coal requirements during the ensuing year, were received until 8 p.m. June 4. Bids were requested on 300 tons of egg coal, 100 tons of stove, 200 tons of pea or buckwheat and 300 tons of bituminous. Address William H. Benedict, Supply Committee, Bd. of Edu., New Brunswick, N. J.

✚**No. 693—Madison, Wis.**—About 40 separate proposals from 17 different coal companies have been submitted on this contract (p. 877), which provides for furnishing the University with its fuel requirements during the ensuing year. Tests of the various coals are now being conducted, and if these prove satisfactory, the contract will be awarded to D. E. McMillan & Bros., of Chicago. The tonnage involved aggregates 4000 tons of Nos. 2 and 3 screened coal at $2.70 per ton and 1600 tons of ¾-in. screenings at $2.20 per ton. Address Bus. Mgr. H. J. Thorrkelson, University of Wisconsin, Madison, Wis.

✚**No. 706—New York**—Bids on this contract (pp. 877, 915, 955, 1004), were reopened at noon, June 11. There were nearly 25 changes made in the original tonnages of the first specifications, aggregating 8834 tons. The total number of tons bid on was 233,359 instead of 242,193. The principal changes were: Zone 1—2236 tons of egg coal instead of 3038 tons. Zone 3—1041 tons of egg instead of 1191 tons; 390 tons of broken instead of 500 tons, and 285 tons of buckwheat No. 2 instead of 450 tons. Zone 5—12,000 tons of buckwheat No. 3 instead of 11,100 tons. Zone 18—1390 tons of stove instead of 1290 and 1760 tons of pea instead of 1560 tons. Zone 20—2100 tons of mine-run instead of 2900 tons. Address Secy. F. R. Leach, Central Purchasing Committee, Room 1126 Municipal Bldg., New York City.

✚**No. 720—Baltimore, Md.**—This contract (p. 916), which provides for furnishing the local Lighthouse Inspector with coal during the fiscal year ending June 30, 1916, has been recommended for award as follows: Notti- gham & Wrenn, Inc., item 1, $885; item 2, $1180; item 8, $3100; item 10, $758; total, $5923. Norfolk Coal & Ice Co., item 3, $110.50; item 7, $1120; total, $1230.50. Henry T. Hidden, item 4, $1982.50; item 5, $464.10; total, $2446.60. O. W. Guy Co., item 6, $8505. B. Nicoll & Co., item 9. $7504. The gross amount involved in the contract is $25,609.10. Address Lighthouse Inspector, Baltimore, Md.

✚**No. 752—Washington, D. C.**—Bids on this contract (p. 917), which provides for furnishing the United States with coke under Schedule 8287, were as follows:

Tons.....	——100——	250	4000[1]	120	509	1000	800	450[2]
Debevoise, Anderson Co.....	$5.84	$2.49	$5.60	....	....	$4.00	$4.44[3]	$4.70	....
Ernest Law & Co.	....	....	....	....	....	....	5.30	7.40[4]	....
Lynah & Read....	....	....	....	....	....	....	4.44	6.40	....
Cowden Coke Co..	....	....	....	....	....	....	3.95	....	....
Marshall-Matlack Co.....	5.90	4.56	6.00	....	$4.09	4.29	4.20	4.89	$5.80
Moreland Coke Co.	6.50	6.50	6.00	....	4.65	4.55	4.65	....	....
Benj. Nicoll.....	6.30	6.35	6.00	....	4.30	4.30	4.40	....	....
Pocahontas Coke Co.....	....	....	....	....	....	....	....	4.75	....
Jas. Pierpoint & S. Co.....	6.30	6.40	6.25	....	4.50	4.60	4.60	....	....
Parkinson C. & C. Co.....	....	....	....	10¾c.	....	....	....	....	....
E. B. Townsend C. Co.....	5.18	....	5.78	....	....	....	....	....	....
John Wills.....	....	....	....	....	4.60	4.60	4.90	6.60	....

[1] Bushels. [2] Cupola coal. [3] Also 34 05. [4] Also $7.50.

Address Paymaster-Gen. of the Navy Samuel McGowan, Washington, D. C.

✚**No. 753—Irvington, N. J.**—All of the five bids submitted on this contract (p. 917), which provides for furnishing the local schools with coal, were exactly the same, being $6 per ton for stove and $4.40 for pea. Address Secy. William A. Sherman, Board of Education, Irvington, N. J.

New Business

✚**No. 816—Steubenville, Ohio**—Sealed bids will be received until noon June 14 for furnishing the local Water-Works Department with coal during the fiscal year beginning on that day. The coal must be clean and free from slate, and price quoted should be f.o.b. Alikanna Station, on the Cleveland & Pittsburgh R.R. All bids must be accompanied by a certified check for $200. Address Dir. of Pub. Service James P. Garvin, Steubenville, Ohio.

No. 817—Chicago, Ill.—The Barrett Varnish Co. will be in the market about July 15 for three cars of Pocahontas mine-run. Address Purchasing Agent, Barrett Varnish Co., Chicago, Ill.

✚**No. 818—Moline, Ill.**—The Board of Education at this place will contract some time in July for about 2500 tons of lump coal. The business is let on competitive bids, and the present contract is being filled at $3.40 per ton. Address Chn. Supply Com. H. S. Bennett, Reliance Bldg., Moline, Ill.

✚**No. 819—Austin, Tex.**—Sealed bids will be received until 10 a.m. June 21 for furnishing the state charitable institutions with a three to twelve months' supply of coal beginning Sept. 1. Address State Pur. Agt. George Leavy, Austin, Tex.

+No. 820—Indianapolis, Ind.—The State Government will receive sealed bids until 11 a.m., June 12, for furnishing the State House with coal during the ensuing year. Specifications can be inspected on application. Address State Engineer, State House, Indianapolis, Ind.

+No. 821—Cranston, R. I.—The Board of Contract and Purchase will receive bids until 8:15 p.m., June 14, for furnishing approximately 1000 tons of coal required by the various city departments. Complete details and specifications may be obtained on application. Address Clk. Daniel D. Waterman, Bd. of Contract and Purchase, City Hall, Cranston, R. I.

+No. 822—Providence, R. I.—Sealed proposals will be received until 2:15 p.m., June 14, for furnishing the coal requirements of the various city departments. Complete details, including specifications may be obtained on application. Address Clk. Wm. C. Pelkey, City Hall, Providence, R. I.

+No. 823—Toronto, Can.—Sealed proposals will be received by the Canadian Government until June 12 for supplying the coal requirements at the Government buildings at Brockville, Cobourg, Hamilton, Kingston, London, Uimico, Penetanguishene, Toronto, Whitley Hospital for the Insane, the Orillia Hospital for Feeble Minded, Woodstock Hospital for Epileptics, Mercer Reformatory, Toronto, Ontario Reformatory, Guelph, and Provincial Brick Plant, Uimico. Complete specifications may be had on application to the bursars of the respective institutions, or address the Provincial Secretary, Parliament Bldg., Toronto, Can.

No. 824—Detroit, Mich.—The Board of Health will receive sealed proposals until June 12 for furnishing anthracite, egg, stove, and chestnut coal to the Tuberculosis Pavilion, Herman Kiefer Hospital, and such quantities of bituminous coal at the Administration Building, and the Board of Health Building as may be required during the fiscal year ending June 30, 1916. Address Secy. John F. McKinlay, Bd. of Health, 223 St. Antoine St., Detroit, Mich.

+No. 825—West Newton, Mass.—Sealed proposals will be received until 2:30 p.m., June 14, for furnishing the coal required by the School, Street, Fire, Police, Charity and Library Departments of the city. Proposals may cover the entire supply, or be only for certain wards. All bids must be accompanied by a certified check for $200, and a bond for $2000 will be required. Bids must be submitted on forms which can be obtained on application. Address Pub. Bldg. Comr. Walter R. Forbush, City Hall, West Newton, Mass.

+No. 826—Detroit, Mich.—The fire commission at this place will receive bids until 2:30 p.m., June 14, for furnishing their coal requirements during the fiscal year beginning June 30. Specifications are on file at the office of the Secretary. Address Secy. George J. Finn, Detroit Fire Dept., Detroit, Mich.

No. 827—Winnipeg, Manitoba, Can.—The Winnipeg Electric Ry. Co. will receive bids until noon, June 17, for supplying the company's fuel requirements during the ensuing year. Complete details may be had on application. Address Purchasing Agent, Winnipeg Electric Ry. Co., Winnipeg, Manitoba, Can.

+No. 828—Grand Forks, N. D.—Sealed bids will be received at the University of North Dakota for furnishing approximately 3000 tons of Youghiogheny, Hocking, Illinois or other screenings during the fiscal year, beginning July 1. Bids will be received until 10 a.m., June 12, and should be submitted on both the B.t.u. and the per ton basis. Specifications and proposal forms may be had on application. A certified check for $350 must accompany each proposal. Address Secy. J. W. Wilkerson, University of North Dakota, Grand Forks, N. D.

+No. 829—Ann Arbor, Mich.—Bids will be received by the University of Michigan until noon, June 17, for furnishing approximately 18,500 tons of coal to be delivered during the year, beginning July 1. Complete specifications may be obtained on application. Address Secy. Shirley W. Smith, University of Michigan, Ann Arbor, Mich.

No. 830—Lebanon, Ind.—The common council will receive bids up to 7:30 p.m., June 14, for furnishing coal for the Lebanon waterworks for one year. Address City Clk. Wm. F. Smith, Lebanon, Ind.

+No. 831—Portsmouth, Ohio—The Board of Education here will receive bids until noon, June 23, for furnishing coal approximately as follows: Smokeless or Pocahontas, 260 tons; mine-run, 1100 tons; lump, 20 tons. Bids are to cover cost of delivery to the several school buildings, delivery to be completed by Aug. 14. All bids must be accompanied by a certified check for 10% of the amount of the bid, and the successful bidder must give a bond of 50% of the amount of the contract. Address Clk. William C. Hazlebeck, Bd. of Edu., Portsmouth, Ohio.

+No. 832—Johnstown, Penn.—Bids will be received some time in July for furnishing the local Board of Education with approximately 3000 tons of the best quality mine-run coal, deliveries to be made as ordered by the janitor. On last year's contract, the First and Second Districts were supplied at $1.38 per ton and the Third District at $1.53. The call for bids is advertised. Address Secretary, Board of Directors, 601 Swank Bldg., Johnstown, Penn.

+No. 833—Jasper, Ind.—The Light and Water Department at this place will be in the market some time in July for 1800 tons of bituminous coal, which is usually bought at $1.70 per ton delivered in the bins. The business is let on competitive bids. Address Supt. Joseph P. Kunkel, Jasper Electric Light & Water-Works, Jasper, Ind.

+No. 834—Albany, N. Y.—Bids will be received until 10 a.m., June 14, for furnishing the State Armory with 225 tons of egg and 5 tons of chestnut coal. Address County Treas. Isaac La Grange, Albany, N. Y.

+No. 835—Muskegon, Mich.—The Board of Education will be in the market some time in July for approximately 3000 tons of various grades of coal. The call for bids is advertised and the business usually let to local dealers. Address Board of Education, Muskegon, Mich.

+No. 836—Trenton, N. J.—The State Board of Education will receive bids until 10:30 a.m., June 12, for furnishing coal as follows: 250 tons buckwheat, 10 tons pea, 150 tons egg, 50 tons stove, 10 tons bituminous. Specifications may be obtained on application. Address Department of Public Instruction, State Board of Education, Trenton, N. J.

No. 837—Fulton, Mo.—The Water, Light and Power Plant at this place will be in the market some time during July for approximately 4000 tons of bituminous coal. The business is let on a competitive basis and is usually concluded at $2.60 per ton. Address Supt. W. J. McCarrel, Municipal Water, Light & Power Plant, Fulton, Mo.

+No. 838—Joplin, Mo.—The Board of Education here will be in the market probably in July for 1000 to 1200 tons of a good grade of lump coal. The coal has usually been bought in the past from mining companies in carload lots, but will probably be purchased from local dealers during this year. From $2.90 to $3 per ton is the ruling price. The call for bids is advertised. Address Secretary, Board of Education, 301 Miners Bank Bldg., Joplin, Mo.

+No. 839—Hoboken, N. J.—The Board of Education received bids until 8 p.m., June 7, for furnishing about 5000 tons of egg, nut, stove and pea coal each. Referring to the announcement in our contract No. 676 (Vol. 7, p. 876) to the effect that all the future requirements of Hoboken would be purchased through a central committee, it appears that the commissioners who determined upon this course have exceeded their authority under the Walsh act, and that school contracts may not be included in this. Address Business Mgr. R. A. Marnell, Bd. of Edu., Hoboken, N. J.

+No. 840—Newark, N. J.—The Board of Education at this place will receive bids until 3:15 p.m., June 17, for furnishing coal requirements during the ensuing year. Specifications may be had on application. Address Secy. R. D. Argue, Dept. of Supplies, Third Floor, City Hall, Newark, N. J.

+No. 841—Chester, Penn.—The City Property Committee at this place will be in the market some time in July for approximately 1200 tons of Lehigh coal. The call for bids is advertised and the contract made usually at about $6.20 per ton. Address Chn. of Property Com. W. L. Booth, 1013 Edgmont Ave., Chester, Penn.

+No. 842—Columbus, Ga.—Bids will be received until June 15 to furnish 400 tons of coal suitable for use in school furnaces, f.o.b. cars Columbus, Ga.; 300 tons are to be delivered before Sept. 1 and 100 tons to be delivered during the month of January, 1916. Prices are desired on both mine-run and nut coal. Address Supt. R. B. Daniel, Public Schools, Columbus, Ga.

+No. 843—Columbus, Ohio—Sealed bids will be received until June 23 for furnishing and delivering coal to the Court House, Memorial Building, County Morgue and County Infirmary as may be directed. All of the coal is to be mine-run. The estimated amounts required are: Court House, 1200 tons; County Infirmary, 4000 tons; Memorial Building, 200 tons, and County Morgue, 15 tons. All coal for the County Infirmary is to be delivered on the infirmary switch of the Norfolk & Western in not less than carload lots. The County Commissioners reserve the right to reject any or all bids. Address Clk. John Scott, of the Bd. of County Comrs., Columbus, Ohio.

+No. 844—Lexington, Ky.—The Board of Education at this place will be in the market some time during the next month for its annual requirements of coal, amounting to about 1000 tons. Screened lump coal is mostly used, and the price made is about $2.90 per ton, delivered to the schools as required.

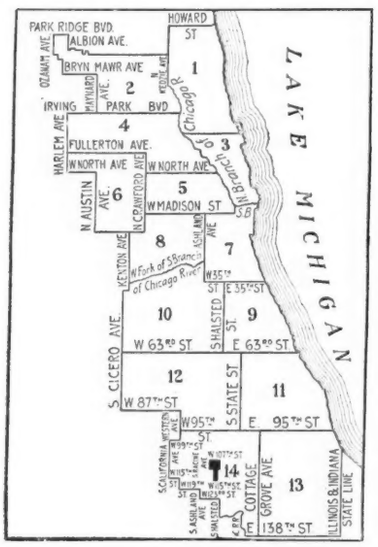
The call for bids is advertised. Address Board of Education, Lexington, Ky.

✚No. 845—Washington, D. C.—Sealed bids will be received until noon, June 22, for furnishing 300 gross tons of bituminous splint coal to be delivered in carload lots, f.o.b., Navy Aëronautic Station, at such times as may be required during the fiscal year ending June 30. Address Navy Dept., Bureau of Supplies and Accounts, Washington, D. C.

No. 846—Camden, Ark.—The Arkansas Light & Power Co. at this place usually contracts during July for its annual requirements of coal, amounting to 230 tons of Arkansas slack. The coal is usually bought at $2.40 f.o.b. Camden. Address Purchasing Agent, Arkansas Light & Power Co., Camden, Ark.

✚No. 847—Monessen, Penn.—The School Board at this place will receive bids until June 15 for furnishing and delivering a good grade of mine-run coal to the various school buildings. Address Secy. C. H. Dills, Bd. of Edu., Monessen, Penn.

✚No. 848—Chicago, Ill.—The Board of Education will receive bids until noon, June 16, for furnishing and delivering coal to the various schools and other buildings of the department during the school year ending June 30, 1916. All proposals must be accompanied by a certified check for $200. Separate proposals are solicited for the new John Worthy School, which it is estimated will require 750 tons of bituminous lump. About 131,025 tons of bituminous coal of various grades and sizes will be required, and 3361 tons of anthracite. The estimated requirements of the various districts are given in the accompanying table, and the limits of the districts are shown on the map herewith. The map, however, does not show the newly annexed Town of Clearing, in which it is estimated that 120 tons of smokeless mine-run will be required. Address Secy. L. E. Larson, Bd. of Edu., Tribune Bldg., Chicago, Ill.



Dis.	No. of Buildings	Anthracite Egg	Range	Nut	Total	Bituminous Lump	M.R.[1]	Nut	Nut Screen.	Total
1	27	70	130	9	209	8,600	....	1700	1000	11,300
2	16	15	217	5	237	4,000	....	....	....	4,000
3	27	...	66	51	117	8,940	....	....	 2000	10,940
4	34	77	139	34	250	8,505	30	....	1300	9,835
5	31	...	244	49	293	11,100	310	....	....	11,410
6	24	90	206	27	323	4,675	....	....	 1500	6,175
7	38	...	138	196	334	14,405	500	....	500	15,405
8	41	...	379	94	473	16,820	....	....	1300 2000	20,120
9	35	...	100	59	159	12,690	400	1500	....	14,590
10	26	123	152	53	328	6,550	120	....	....	6,670
11	23	75	140	38	253	6,240	....	....	....	6,240
12	20	...	128	19	147	5,140	....	....	 2800	7,940
13	6	50	45	6	101	1,080	....	....	....	1,080
14	20	...	132	5	137	4,350	90	130	....	4,570
Totals	368	500	2216	645	3316	113,095	1450	3330	4100 8300	130,275

[1] Smokeless mine-run.

✚No. 849—Dorchester Center, Mass.—The State Hospital Trustees received bids until 10:30 a.m., June 11, for furnishing 275 tons of anthracite coal. Address Henry Lafavour, Finance Com., Boston State Hospital Commission, Dorchester Center, Mass.

Contracts Awarded

✚No. 130—Lansing, Mich.—This contract (p. 357), which provides for furnishing the Local Board of Education with about 1700 tons of Pocahontas mine-run coal, has been awarded to the **Lansing Artificial Stone Co.**, at $3.70 per ton. This price is three cents per ton under that of the old contract. Address Secy. Sylvia L. Hunter, Supply Com., City Hall, Lansing, Mich.

✚No. 442—Minot, N. D.—This contract (p. 672), which provides for furnishing Ward County with coal during the ensuing year, has been awarded to **L. D. Colton,** at $2.30 per ton for lignite coal. Address County Audr. L. J. Thompson, Minot, N. D.

✚No. 531—Frankfort, Ky.—This contract (pp. 357, 748), which provides for furnishing the State Prison and the School of Reform with about 19,000 tons of coal, has been awarded to the **Stearns Coal & Lumber Co.** The contract for the State Reformatory covering 12,000 tons was let at $1.98 per ton, or 2c. less than the old contract, and the contract for the Reformatory covering 7000 tons was let at $2.08 per ton, or 12c. less than the original contract. Because of the uncertainty regarding the decision of the Interstate Commerce Commission on freight rates, West Virginia operators were eliminated from consideration in the contract. Address State Prison Commission, Frankfort, Ky.

✚No. 588—Everett, Mass.—This contract (pp. 749, 918), which provides for furnishing the local Board of Education with its coal requirements has been awarded as follows: **J. E. Lewis & Co.,** egg, stove and nut, $6.38; New River bituminous, $4.63. **Metropolitan Coal Co.,** screenings, $3.65. Address Chn. of Com. on Fuel Charles Manser, High School Bldg., Everett, Mass.

✚No. 597—Columbus, Ohio—This contract (p. 794), which provides for furnishing the local Board of Education with coal during the ensuing year, has been awarded as follows: **Franklin Builders Supply Co.,** 8000 tons of Hocking two-in. lump, $2.34. **Homer C. Gill,** 500 tons of Pocahontas lump, $3.07½. All bids for the Crestview school building were rejected, and the board given authority to purchase the supply for this building wherever it desires. Address Chn. Bd. of Edu. E. B. McFaddin, Columbus, Ohio.

✚No. 659—Philadelphia, Penn.—This contract (p. 836), which provides for furnishing the local Lighthouse Department with coal requirements during the fiscal year, June 30, has been awarded to **J. H. Weaver & Co.,** at $2.65 per ton. The Pennsylvania Coal & Coke Corp. bid $2.60; J. Tatnall Lea & Co., $2.74; Coale & Co., $2.74 and $2.89. Charles Warner Co. was awarded the contract for the light stations and tenders at $5.90 for stove coal, and $6.05 for nut. Address Lighthouse Inspector, Philadelphia, Penn.

No. 813—Boston, Mass.—This contract (p. 1006), which provides for furnishing the Stone & Webster Co. with 15,000 tons of New River or Pocahontas mine-run coal for shipment at one of the lower Lake ports, has been awarded to the **New England Coal & Coke Co.** Address Purch. Agt. R. E. Hamilton, Stone & Webster Co., 147 Milk St., Boston, Mass.

Contract Notes

New Orleans, La.—The **Tennessee Coal & Iron Co.** and the **R. B. Hyams Coal Co.,** of New Orleans, were lowest bidders on the United States plant coal contract, at the Naval Station, Algiers, La., and Burwood, La. The bids have been forwarded to the Chief of Engineers, Washington, D. C. This contract has attracted considerable attention since Mar. 29, and every company in New Orleans was competing on it.

Olympia, Wash.—The **Durham Collieries Co.,** of Tacoma, has been awarded the contract for 2000 long tons of coal to be furnished the Western Washington Hospital for Insane at a price of $3.18 per ton. This supply is expected to last six months.

Italy—A business man in Italy informs an American consular officer that he desires to receive quotations from dealers in bunker coal.

✚Kearney, N. J.—The Board of Education here awarded the contract for its fuel supply during the ensuing year to the **S. Smith Coal Co.** The contract includes 200 tons of anthracite stove, 240 tons of egg and 275 tons of nut. The price quoted was $5.85 per ton for delivery previous to July, and $6.30 per ton for delivery from then until April, 1916.

✚Elmira, N. Y.—On the bids for furnishing the county with coal during the coming year, B. Yenger was the lowest at $5.75 per ton previous to September, and $6 thereafter. Over 17 bids were received on the contract.

Spain—A business man in Spain informs an American consular officer that he desires to represent American exporters of coal. Correspondence may be in English.

Wilmington, Del.—The **Pennsylvania Coal & Coke Corp.** has been awarded the contract for supplying the Lighthouse Tender (Iris) with coal at $2.60 per ton. J. Tatnall Lea & Co. bid $2.75 and $2.64, and Charles Warner Co. bid $3.05.

Duluth, Minn.—The City Government at this place has rejected all bids submitted for furnishing their coal requirements during the year beginning July 1, on the ground that inferior coal is always supplied on the contract. The Pittsburgh Coal Co. bid $12,500 on approximately 3000 tons. The city believes that they pay as much on a contract as they would by purchasing in the open market, and under the latter condition they would be able to get considerable competition from local dealers.